



Extron® Electronics

INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual



DVS 406
Digital Video Scaler Series
DVS 406, DVS 406 A, DVS 406 D, and DVS 406 AD

Precautions

Safety Instructions • English

-  This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.
-  This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

- Read Instructions** • Read and understand all safety and operating instructions before using the equipment.
- Retain Instructions** • The safety instructions should be kept for future reference.
- Follow Warnings** • Follow all warnings and instructions marked on the equipment or in the user information.
- Avoid Attachments** • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français

-  Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).
-  Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

- Lire les instructions** • Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.
- Conserver les instructions** • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.
- Respecter les avertissements** • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.
- Eviter les pièces de fixation** • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch

-  Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.
-  Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

- Lesen der Anleitungen** • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.
- Aufbewahren der Anleitungen** • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufzubewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.
- Befolgen der Warnhinweise** • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.
- Keine Zusatzeräge** • Verwenden Sie keine Werkzeuge oder Zusatzeräge, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español

-  Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.
-  Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

- Leer las instrucciones** • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.
- Conservar las instrucciones** • Conservar las instrucciones de seguridad para futura consulta.
- Obedecer las advertencias** • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.
- Evitar el uso de accesorios** • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

Warning

- Power sources** • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.
- Power disconnection** • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).
- Power cord protection** • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.
- Servicing** • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.
- Slots and openings** • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.
- Lithium battery** • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

- Alimentations** • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.
- Déconnexion de l'alimentation** • Pour mettre le matériel hors tension sans danger, déconnectez tous les cordon d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.
- Protection du cordon d'alimentation** • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.
- Réparation-maintenance** • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.
- Fentes et orifices** • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.
- Lithium Batterie** • Il a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Vorsicht

- Stromquellen** • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät würde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.
- Stromunterbrechung** • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stromversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.
- Schutz des Netzkabels** • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.
- Wartung** • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.
- Schlitzte und Öffnungen** • Wenn das Gerät Schlitzte oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.
- Lithium-Batterie** • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

- Alimentación eléctrica** • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminarla.
- Desconexión de alimentación eléctrica** • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.
- Protección del cables de alimentación** • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.
- Reparaciones/mantenimiento** • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.
- Ranuras y aberturas** • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.
- Batería de litio** • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Deschar las baterías usadas siguiendo las instrucciones del fabricante.

Quick Start — DVS 406

Installation

Step 1

Turn off power to the scaler and input and output devices, and remove power cords from them.

Step 2

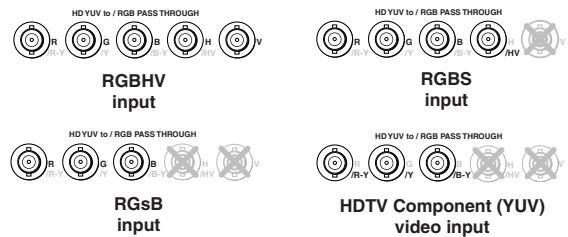
Install the four rubber feet on the bottom of the DVS 406 scaler, or mount the scaler in a rack.

Step 3

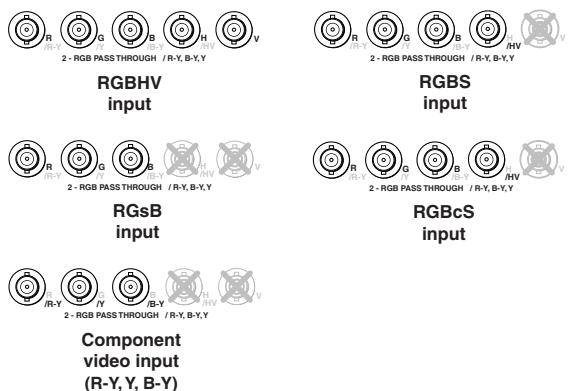
Attach input devices to the scaler.

Rear panel video inputs

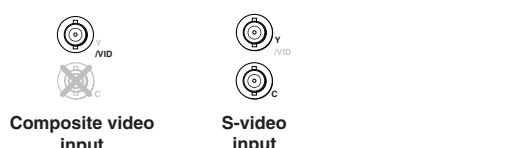
Input 1: RGB and HD YUV pass-through



Input 2: RGB pass-through, RGBcS, YUVi, YUVp



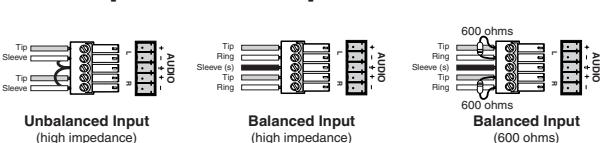
Inputs 3 - 5: composite video, S-video



Input 6: SDI (serial digital interface)

Attach an SDI source to this BNC (DVS 406 D and DVS 406 AD models only).

Rear panel audio inputs



Inputs 1 - 6: balanced and unbalanced

Step 4

Attach output devices to the scaler.

Rear panel video output

Output BNC connectors



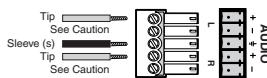
RsGsBs (output only if input is RsGsBs)



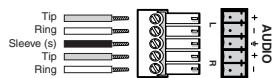
NOTE Both connectors will output simultaneously. The sync format is the same for both outputs.

Rear panel audio output

Unbalanced Output



Balanced Output



CAUTION Connect the sleeve to ground. Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.

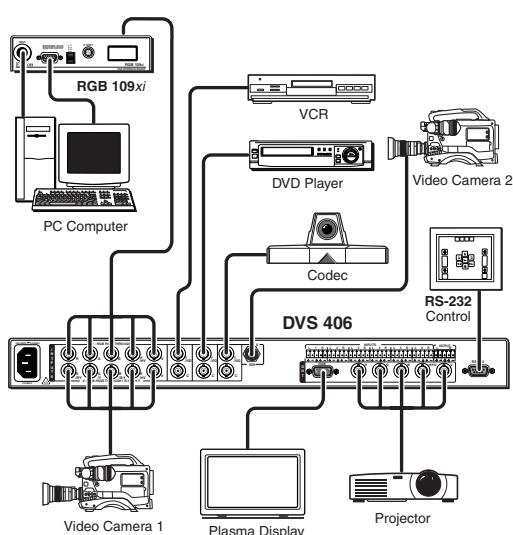
Step 5

Plug the DVS 406, and input and output devices into a grounded AC source, and turn on the input and output devices.

Step 6

Use the LCD menu screens (see the next page) or RS-232 programming to configure the scaler. See chapter two for installation and operation procedures, and see chapter three for programming information.

Application Example



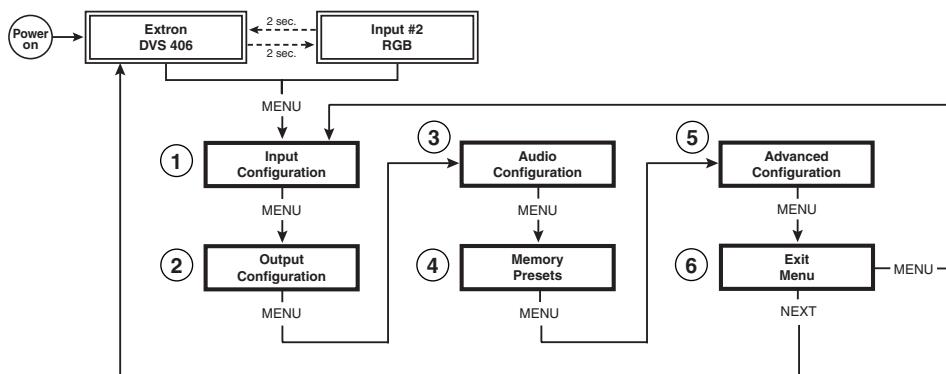
Quick Start — DVS 406, cont'd

DVS 406 Menu System

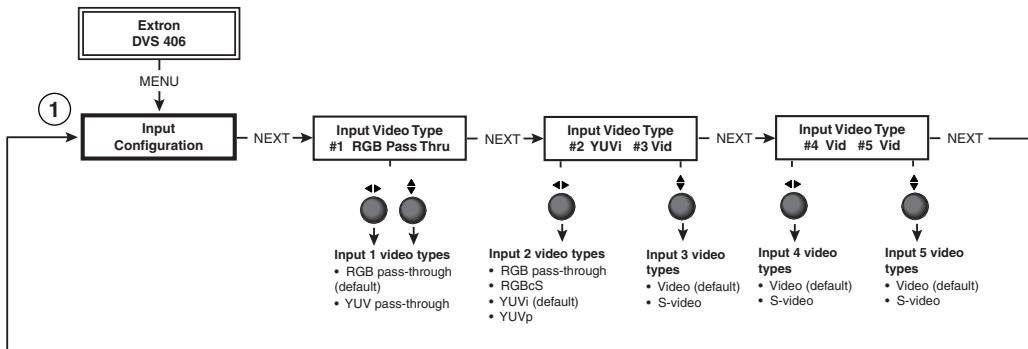
Default Cycle menu



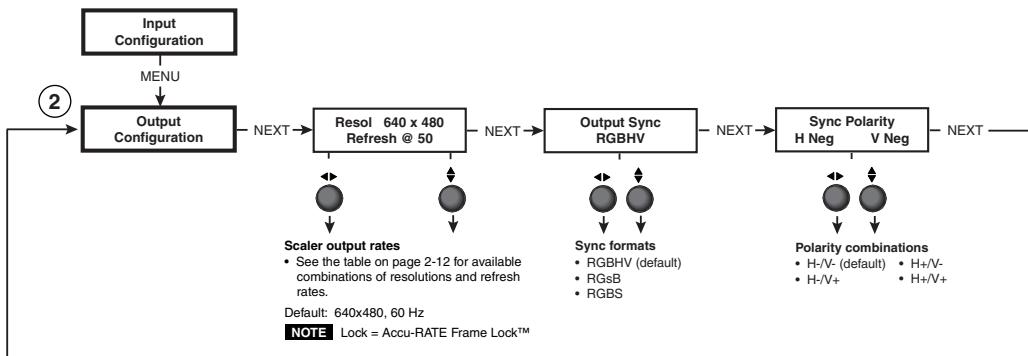
Main menu



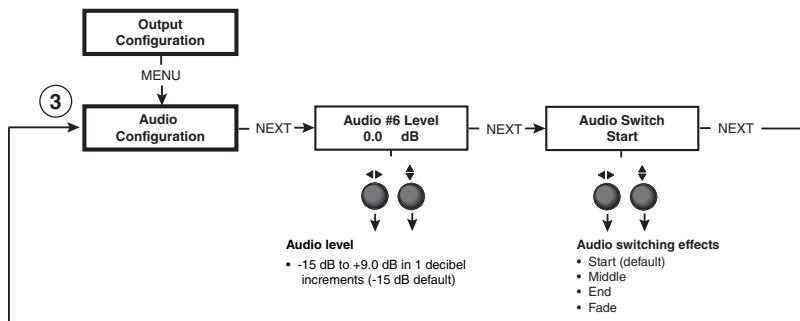
① Input menu



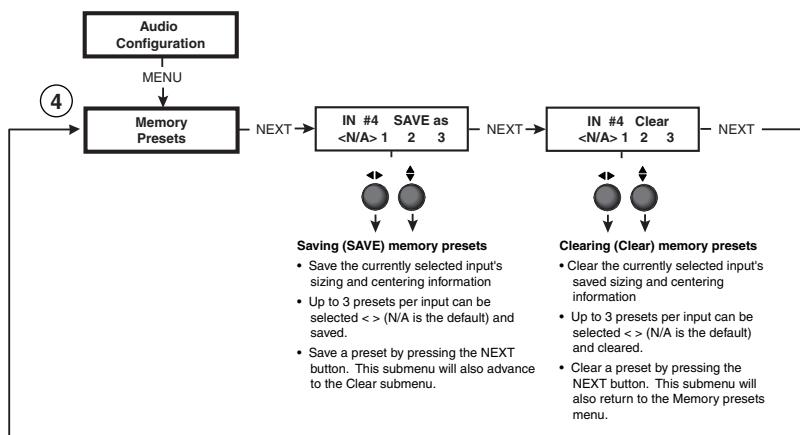
② Output menu



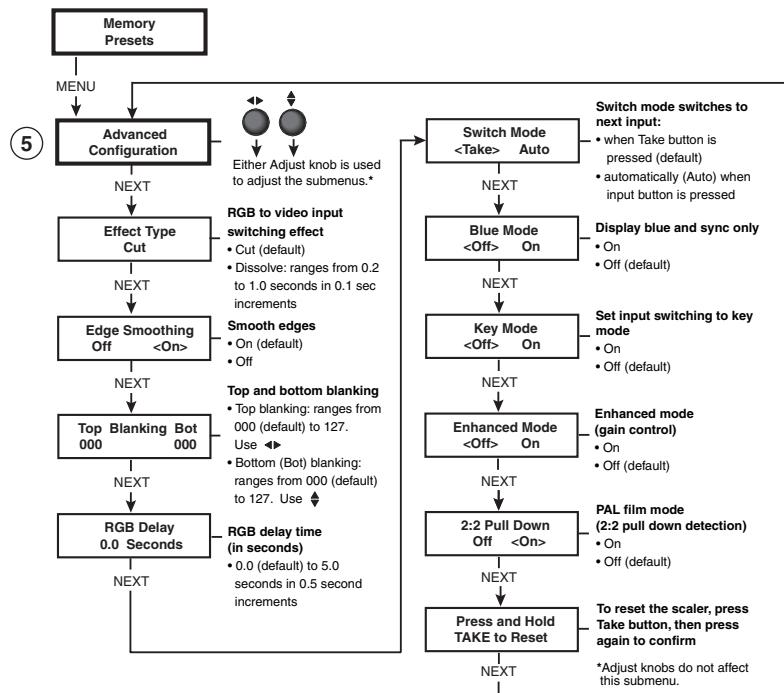
③ Audio Configuration menu



④ Memory Presets menu

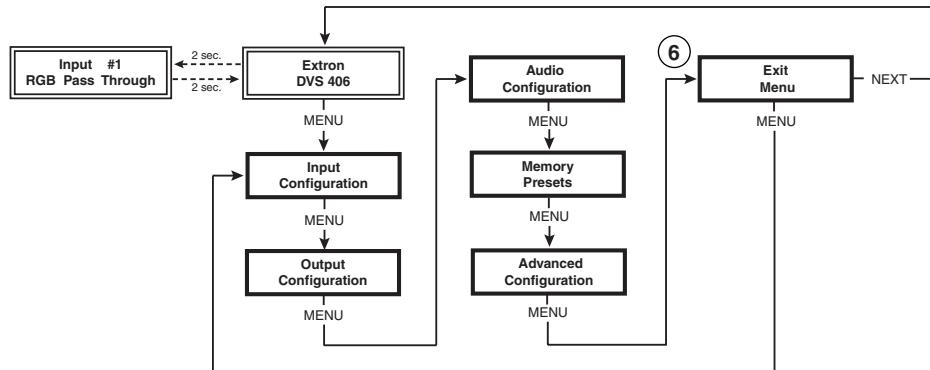


⑤ Advanced Configuration menu

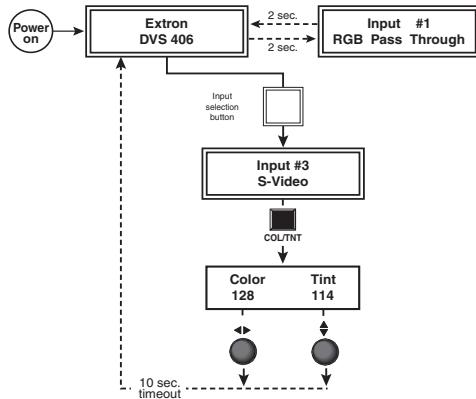


Quick Start — DVS 406, cont'd

⑥ Exit menu

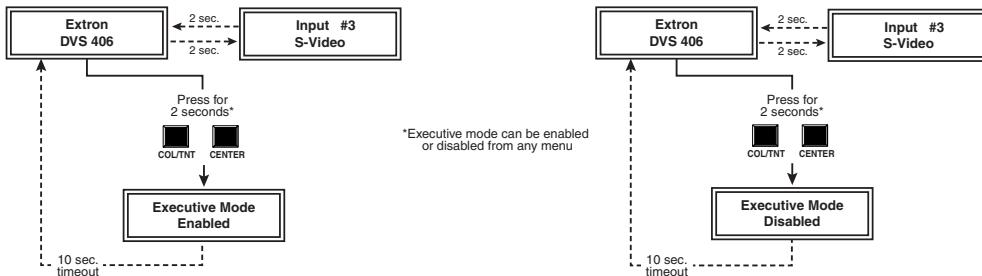


Picture Adjustments menu



NOTE The horizontal Adjust knob and the vertical Adjust knob are used to adjust the image settings on the left and right sides of the LCD screen, respectively.

Executive Mode menu



*Executive mode can be enabled or disabled from any menu

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DVS 406

1

Chapter One

Introduction

About this Manual

About the DVS 406

Features and Options

Introduction

About this Manual

This manual discusses how to install, configure, and operate the Extron DVS 406 digital video scaler and how to operate the optional IR 901 infrared remote control (part #70-152-01).

Throughout this manual the terms "DVS", "digital video scaler", and "scaler" are used interchangeably to refer to the same product.

About the DVS 406

What is the DVS 406?

The DVS is a series of high performance digital video scalers that offers seamless switching between input 1 and other video inputs. This is accomplished by locking the scaled output rate to the horizontal and vertical frequencies of input 1. The DVS 406 offers 55 output rates, including HDTV, and provides scaling solutions for boardrooms, conference rooms, and home theaters, as well as rental and staging applications.

The scaler comes in four models, two of which offer a serial digital interface (SDI) input connector: DVS 406 (no SDI and no audio), DVS 406 A (no SDI but with audio), DVS 406 D (SDI and no audio), and DVS 406 AD (SDI and audio).

The DVS accepts computer video (RGB), component video, S-video, and composite video, and each input is separately configurable. Audio versions of the scaler accept six line-level, balanced or unbalanced stereo audio inputs.

To enable superior scaling performance, the DVS 406 features several of Extron's patent-pending technologies, including Dynamic Motion Interpolation™ (DMI™) technology, and 3:2 and 2:2 pulldown detection. DMI is an advanced motion detection and compensation method that enables image enhancement with no loss of image fidelity.

The DVS 406 scales composite video, S-video, and component video up to computer-video (RGBHV/RGBS/RGsB), which can be output to two display devices via individually buffered BNC and 15-pin HD connectors. The DVS 406 offers one line level stereo audio output.

Controlling the DVS 406 digital video scaler

The DVS 406 can be controlled using one or more of the following methods:

- The front panel controls.
- A computer, a touch screen panel, or any other device that can send and receive the serial communications through the RS-232 port. Extron's Simple Instruction Set™ (SIS™) is a set of simple keystroke commands that can be used with any such devices, and Extron's control software for Windows provides a graphical interface for controlling the scaler from a computer.
- The optional IR 901 remote control, which has most of the front panel controls.

Features and Options

Features

Six video inputs —

- **Input 1** — Five BNC connectors on the rear panel accept RGBHV/RGBS/ RGsB computer video for pass-through, or HDTV YUV video for pass-through.
- **Input 2** — Five BNC connectors on the rear panel accept RGBHV/RGBS/ RGsB as pass-through computer video, RGBcS, and component video (interlaced and progressive).
- **Inputs 3 to 5** — Three pairs of BNC connectors on the rear panel accept S-video or composite video signals.
- **Input 6** — DVS 406 D and DVS 406 AD are equipped with an SDI connector for a serial digital interface signal.

Buffered video outputs — Five rear-panel BNC connectors and one VGA-type 15-pin HD connector provide connections for RGB or component video (YUV) output. Both outputs (the BNCs and the 15-pin HD connector) are active at all times for simultaneous output.

Six balanced or unbalanced stereo audio inputs — The audio versions of the DVS 406 (406 A and 406 AD) are equipped with six rear panel captive screw connectors that accept audio inputs. Each input's audio level can be individually set.

One balanced or unbalanced stereo audio output — One line level output is provided on 3.5 mm, 5-pole captive screw terminals.

Audio breakaway — Audio and video can be switched separately via RS-232.

Three ways to control the scaler — The scaler's front panel, a computer or other RS-232 control device, or the optional IR 901 remote control can all be used to control the scaler.

Scaled outputs — The DVS 406 offers 55 different output rates.

RS-232 configuration — The DVS 406 can be configured by using the Extron control software for Windows, or by using a third party control system.

Triple-Action Switching™ — With this method, a blank screen is displayed while the DVS 406 switches between inputs.

Accu-RATE Frame Lock™ — The Extron Accu-RATE Frame Lock™ (patent pending) eliminates artifacts from scaled motion video by eliminating frame rate conversion. It locks the output frame rate to the input frame rate of the active input. The result is a switching system that eliminates image tears and other artifacts from motion video.

Dynamic Motion Interpolation™ (DMI™) — This video processing technique is an advanced motion prediction and compensation method that treats motion content and still content with different algorithms to yield high fidelity images.

Introduction, cont'd

3:2 pulldown detection for NTSC and 2:2 film detection for PAL video

sources — These advanced film mode processing features help maximize image detail and sharpness for video sources that originated from film. When film is converted to NTSC video, the film frame rate has to be matched to the video frame rate in a process called 3:2 pulldown. Jaggies and other image artifacts can result if conventional deinterlacing techniques are used on film-source video. The DVS 406's advanced film mode processing recognizes signals that originated from film. The DVS 406 then applies video processing algorithms that optimize the conversion of video that was made with the 3:2 pulldown process. This results in richly detailed images with sharply defined lines. A similar process is used for PAL film-source video.

Versatile mounting options — The DVS 406 can be rack mounted, or it can be placed on a table or other furniture. Rubber feet and rack mounting hardware are included.

Options and accessories

The DVS 406's optional equipment includes:

- **IR 901 remote control** — Extron's IR 901 (part #70-152-01) is an infrared remote control which replicates all of the front panel controls of the DVS 406 except the Menu and Next buttons.
- **SDI input card** — Serial digital interface (SDI) input can be added to the DVS 406 and 406 A models by the installation of an SDI input card (part #70-168-01).
- **Audio I/O card** — Audio input/output connectors capability can be added to the DVS 406 and 406 D models by installing an audio card (part #70-151-01). The captive screw connectors of the audio card supports both balanced and unbalanced stereo audio input and output.



DVS 406

Chapter Two

Installation and Operation

- Mounting the Scaler
- Rear Panel Features
- Front Panel Features
- Optimizing the System
- Menus, Configuration, and Adjustments
 - Image Adjustments
 - Front Panel Lockout
 - IR 901 Infrared Remote Control
 - Troubleshooting

Installation and Operation

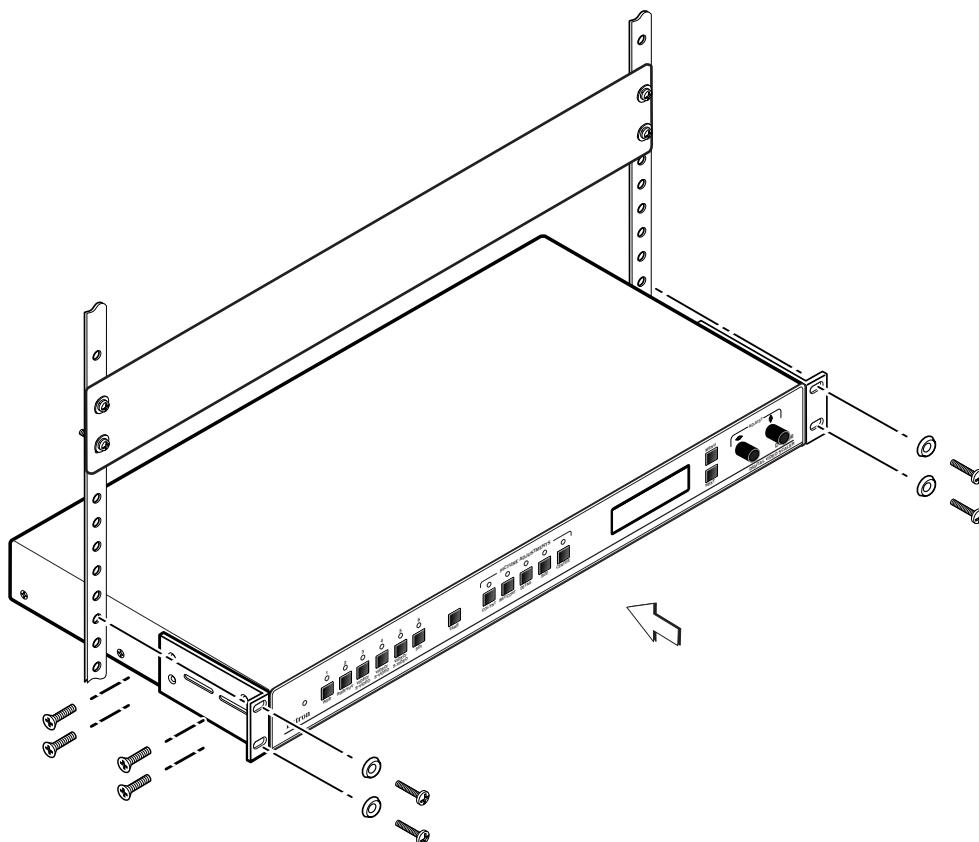
Mounting the Scaler

Tabletop use

The DVS 406 series of scalers comes with rack mounting brackets and rubber feet. For tabletop use, attach a self-adhesive rubber foot to each corner of the bottom of the unit.

Rack mounting

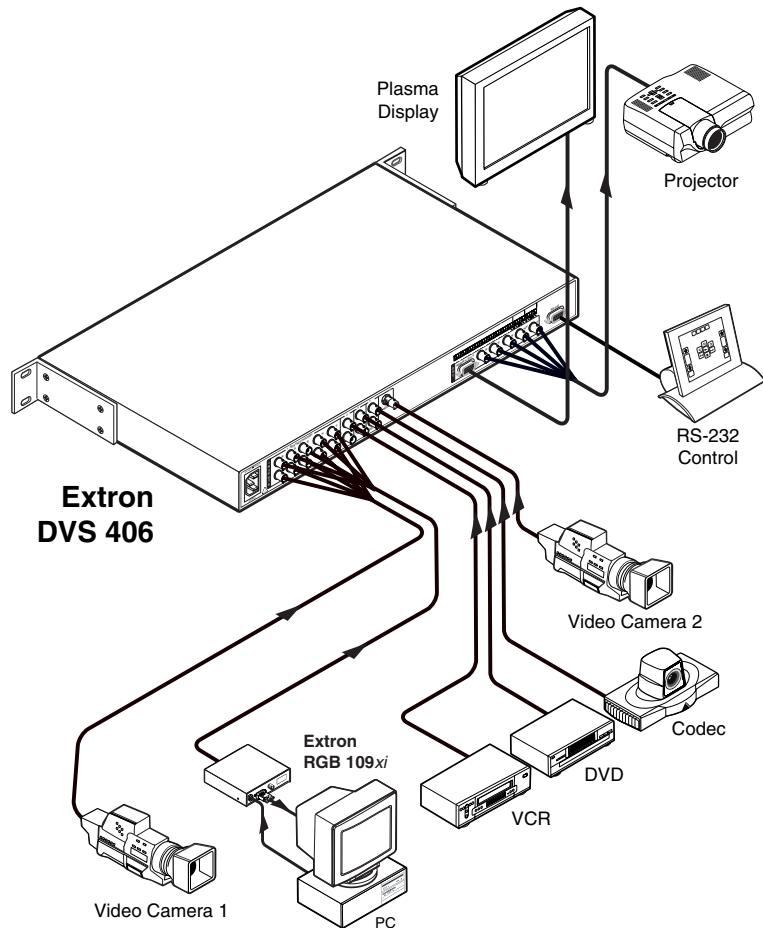
For rack mounting, do not install the rubber feet. Attach the provided rack mounting brackets to the scaler with machine screws, as shown below, then fasten the scaler to the rack using the supplied machine screws.



Rack mounting the DVS 406

Application diagram

The diagram below shows an example of a typical DVS 406 application and cable connections.

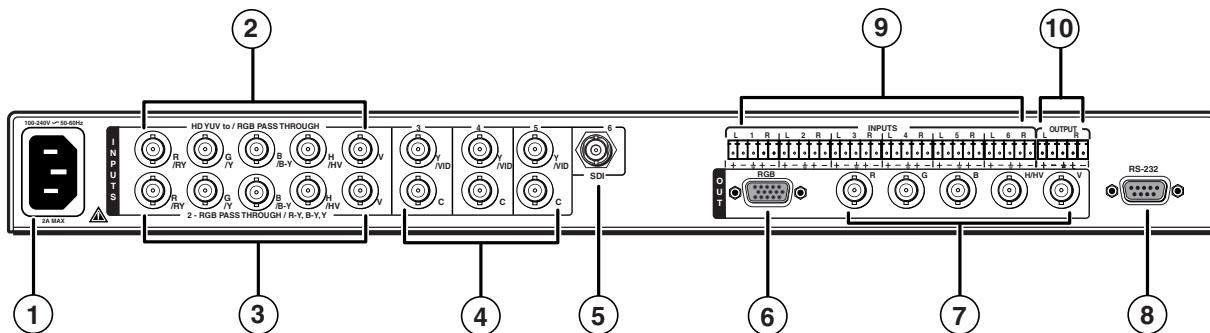


Application diagram example of the DVS 406

Installation and Operation

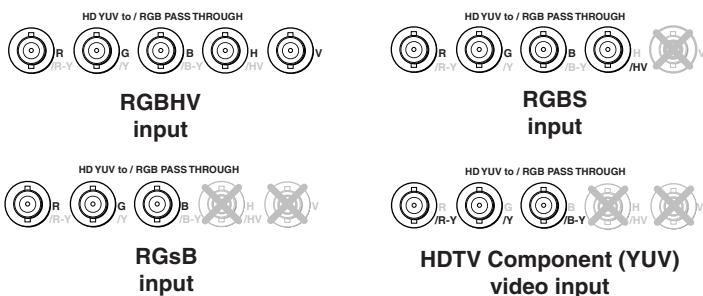
Rear Panel Features

The rear panel of the DVS 406 AD model, as shown below, contains all of the possible connectors available on the DVS 406 series of scalers (406/406 A/406 D/406 AD).



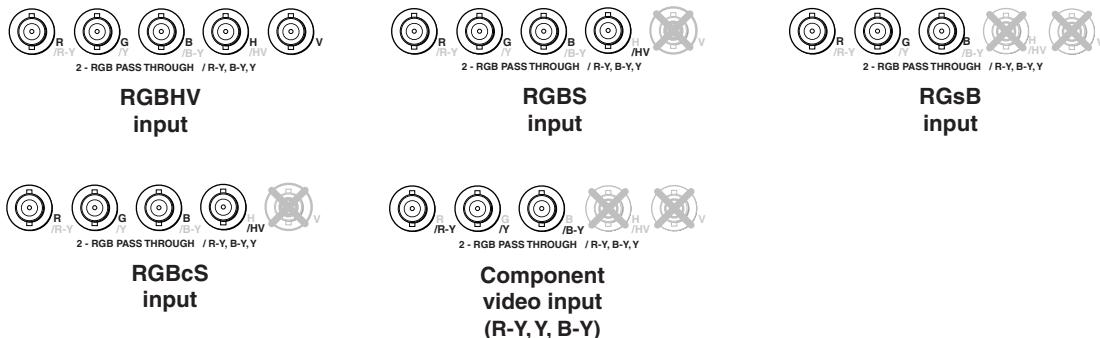
DVS 406 AD rear panel connectors

- ① **AC power connector** — Plug a standard IEC power cord into this connector to connect the scaler to a 100 to 240 VAC, 50 Hz or 60 Hz power source. The front panel control and input selection buttons will light in sequence during power-up.
- ② **Video input 1** — This input, consisting of 5 female BNC connectors, accepts computer video (RGB) and HDTV component video signals. These input signals will be pass-through. Connect cables for the appropriate signal type, as shown here.



NOTE HDTV component video signals will be output as RGB video.

- ③ **Video input 2** — This input, consisting of 5 female BNC connectors, accepts computer video (RGB) and component video (interlaced and progressive) signals. The RGBHV/RGBS/RGsB input signal will be pass-through. Connect cables for the appropriate signal type, as shown here.



NOTE Equipment following the SCART interconnection standard may be connected using the RGBcS input cabling configuration.

④ **S-video/Composite video inputs** — Connect an S-video or composite video signal to the appropriate female BNC connector(s), as shown here.



⑤ **SDI (serial digital interface) input connector** — Connect an SDI signal to this female BNC connector.

NOTE Only DVS 406 D and DVS 406 AD models have an SDI connector.

⑥ **Output 15-pin HD connector** — Connect a display device to this female VGA-style connector for RGB output.

NOTE Both outputs ⑥ and ⑦ are buffered and can be connected simultaneously to two different displays. The sync format will be the same for both outputs.

⑦ **Output BNC connectors** — Connect coaxial cables from a display device to these BNCs for one RGBHV, RGBS, or RGsB/RsGsBs video output as follows:



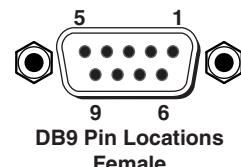
NOTE Both outputs are buffered and can be connected simultaneously to two different displays. For RGB inputs, the output signal's sync format is based on the format of the incoming RGB signal. For all other types of inputs, the user selects the output sync format. The sync format will be the same for both outputs.

⑧ **RS-232 port** — This connector provides for two-way RS-232 communication. See chapter three, "Serial Communication", for information on how to install and use the control software and SIS commands.

The default protocol is 9600 baud, 1 stop bit, no parity, and no flow control.

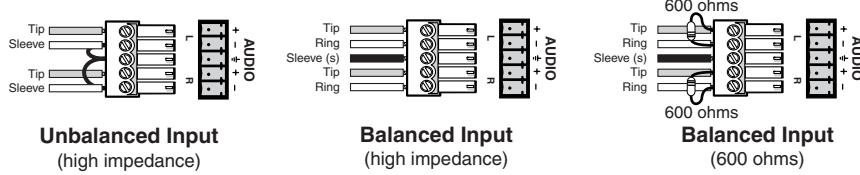
The rear panel RS-232 9-pin D connector has the following pin assignments:

Pin	RS-232 function	Description
1	—	No connection
2	Tx	Transmit data
3	Rx	Receive data
4	—	No connection
5	Gnd	Signal ground
6	—	No connection
7	—	No connection
8	—	No connection
9	hardwired IR	IR input



Installation and Operation, cont'd

⑨ **Audio inputs 1 through 6** — Each input has a 3.5 mm, 5-pole captive screw connector for balanced or unbalanced stereo audio input. See the following wiring diagrams to wire a connector for the appropriate input type and impedance level. High impedance is generally over 800 ohms.



Captive screw connector wiring for rear panel audio inputs

⑩ **Line level audio output** — For unamplified audio output, connect an audio device, such as an audio recorder, VCR, or powered speakers, to this 3.5 mm, 5-pole captive screw connector. Follow the diagram below for correct wiring.

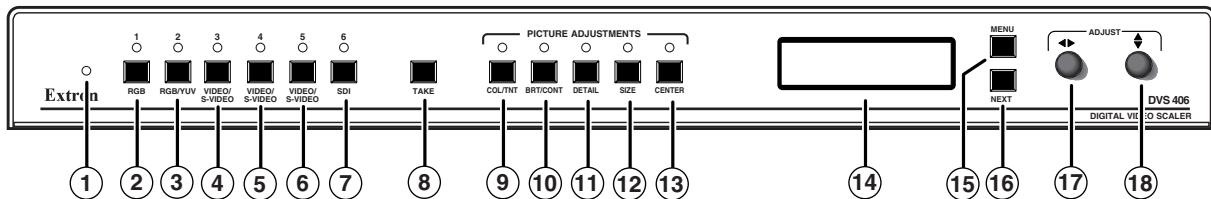


CAUTION Connect the sleeve to ground. Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.

The gain can be set separately for each input channel so that there is no audible difference in level when switching between inputs. See the section "Audio Configuration", in this chapter, for information on adjusting the audio output level via LCD menu and front panel controls. See chapter three, "Serial Communication", for information on using the Simple Instruction Set (SIS) commands and the Windows-based control program to adjust audio levels and to set audio breakaway.

Front Panel Features

The front panel buttons, controls, and LCD of the DVS 406 AD model, as shown below, are found on all models of the DVS 406 scaler series. The LEDs above each button will light green when the button is pressed.



DVS 406 AD front panel

① **Infrared sensor** — This sensor is used to receive infrared (IR) signals from the IR-901 remote control. See the "IR 901 Infrared Remote Control" section in this chapter.

Input selection buttons

② **RGB input button** — This button selects the pass-through RGB computer video or HDTV component video input.

NOTE *HDTV component video input will be output as RGB.*

③ **RGB/YUV input button** — This button selects the RGB computer video or component video input.

④ ⑤ ⑥ **Video/S-video input buttons** — These buttons select from the composite or S-video inputs.

⑦ **SDI input button (serial digital interface)** — This button selects the SDI input 6 (available only on DVS 406 AD and DVS 406 D models).

NOTE *If the audio module is installed and the SDI card is not installed, input 6 will be audio-only and the video output will be a black display.*

Take button

⑧ **Take button** — When this button is enabled through the menu system, selecting an input selection button (② thru ⑦ above) followed by pressing the Take button, will cause a switch to the new input to occur. If the Take button is not enabled, the switch to a selected input will automatically occur when the input button is pressed.

Picture adjustment buttons

NOTE *These buttons have no effect on the pass-through inputs (inputs 1 and 2).*

⑨ **Color/Tint control button (Col/Tnt)** — This button controls the color and tint adjustment on the display by using the horizontal Adjust and vertical Adjust adjustment knobs. The adjustment range of both color and tint is 0 to 255. See the "Image adjustments" section in this chapter.

NOTE *The tint control is only available if the input is composite or S-video.*

⑩ **Brightness/Contrast control button (Br/Cont)** — This button controls the brightness and contrast adjustment on the display by using the horizontal Adjust and vertical Adjust adjustment knobs. The adjustment range of both brightness and tint is 0 to 255. See the "Image adjustments" section in this chapter.

Installation and Operation, cont'd

- ⑪ **Detail control button** — This button controls the detail (peaking) to compensate for long cable runs, and it also controls the sharpness of the display by using the horizontal Adjust and vertical Adjust adjustment knobs. The adjustment range of both detail and sharpness is 0 to 63. Detail is an analog adjustment, while sharpness is a digital adjustment. See the "Image adjustments" section in this chapter.
- ⑫ **Size control button** — This button controls the size adjustment on the display by using the horizontal Adjust and vertical Adjust adjustment knobs. See the "Image adjustments" section in this chapter.
- ⑬ **Center control button** — This button controls the centering adjustment on the output display by using the horizontal Adjust and vertical Adjust adjustment knobs. The adjustment range of both horizontal and vertical centering is 0 to +255. See the "Image adjustments" section in this chapter.

LCD menu display and controls

- ⑭ **LCD** — Displays configuration menus and status information. See the "Menus, Configuration, and Adjustments" section in this chapter for details.
- ⑮ **Menu button** — Use this button to enter and move through the main menu system in the DVS 406. See the "Menus, Configuration, and Adjustments" section in this chapter for details.
- ⑯ **Next button** — Use this button to step through the submenus in the DVS 406 menu system. See the "Menus, Configuration, and Adjustments" section in this chapter for details.
- ⑰ **Horizontal Adjust (↔) knob** — In the menu system, rotate this knob to scroll through menu options and make adjustments.
- ⑱ **Vertical Adjust (↑↓) knob** — In the menu system, rotate this knob to scroll through menu options and make adjustments.

Optimizing the System

For optimal performance, follow the steps in this section in order when setting up the DVS 406 and its input and output devices.

Setting up a DVD source

To get the best results when using a DVD as a video source, Extron recommends that the DVD player itself be setup to output an aspect ratio of 16:9 and not 4:3. Because all DVDs are mastered as 16:9, having them set up for anything else will cause the player to internally scale and compress the signal. This scaling/compression by the DVD player will defeat the advantage of having 3:2 pulldown detection in the DVS 406.

To change the output aspect ratio of most DVD players,

1. Enter the DVD player's Setup or Action menu while the disc is stopped.
2. Select a 16:9 aspect ratio.

Menus, Configuration, and Adjustments

Scaler configuration and adjustments can be performed by using the Windows-based control program (see chapter 3 for details) or by using the front panel controls and the menus that are displayed on the DVS 406's LCD screen. These menus are used primarily when the scaler is first set up.

Moving through menus by using front panel controls

Menu button — Press the Menu button to activate menus and to scroll to the six main menus.

Next button — Press the Next button to move between the submenus of a selected main menu. Pressing the Next button during input configuration causes the current input's number and format type to be displayed on the LCD.

Adjust (\blacktriangleleft , \triangleright) knobs — When configuring the DVS 406, rotate the horizontal Adjust (\blacktriangleleft) knob and vertical Adjust (\triangleright) knob to scroll through submenu options and to make adjustment selections. Refer to the flowcharts in this chapter and to specific sections for explanations on knob adjustments.

Image adjustment buttons: Col/Tnt, (color/tint) Brt/Cont (brightness/contrast), Detail, Size, and Center — When one of these buttons is pressed, the corresponding image adjustment menu appears on the LCD screen. Adjustments can then be made by rotating the horizontal Adjust (\blacktriangleleft) knob or the vertical Adjust (\triangleright) knob. Settings and adjustments are stored in nonvolatile memory.

Menu overview

The default menus appear on the LCD when no adjustments are actively being made. They cycle between the screen showing the name of the scaler (DVS 406/406 A/ 406 D/ 406 AD) and the screen that shows the active input's number and video format, as shown below.

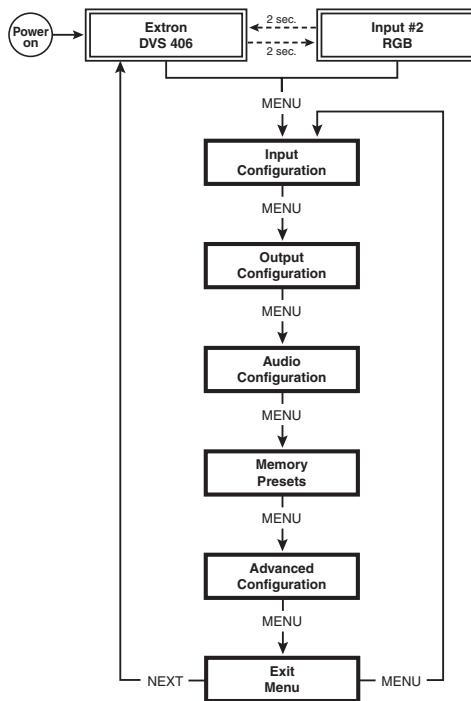


Default menus

NOTE *From any menu or submenu, after ten seconds of inactivity the DVS 406 will save all adjustment settings and time-out to the default menus.*

The main menus are as shown in the following flowchart. Use the Menu key to scroll between them.

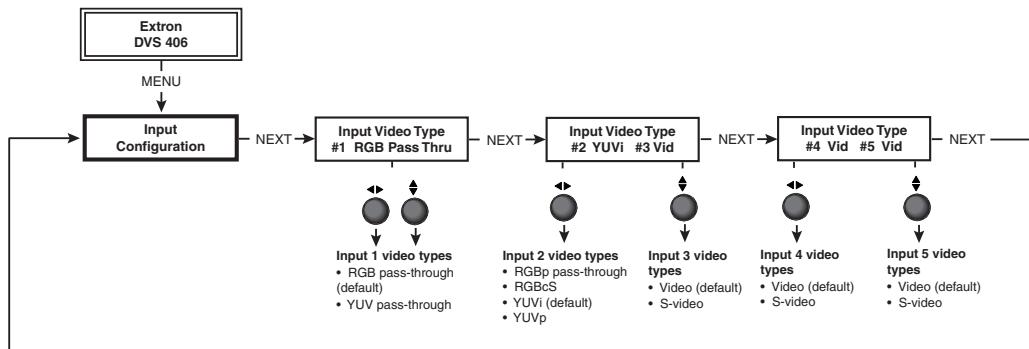
Installation and Operation, cont'd



Main menus

Input Configuration

The following flowchart provides an overview of the Input Configuration submenus and the options for each setting.



NOTE If you press the *Menu* button while a submenu is active, the next main menu will become active. For example, the menu will change from the *Input Configuration* menu or submenus to the *Output Configuration* main menu.

NOTE To return to the default screens, let the DVS 406 time-out for 10 seconds, or press the *Menu* button until the *Exit Menu* menu appears, then press the *Next* button.

Input Video Type #1

Rotate either the horizontal Adjust ($\blacktriangleleft\triangleright$) knob or vertical Adjust (\blacktriangledown) knob while in the Input Video Type #1 submenu to select the appropriate video format (RGB pass-through, YUV HDTV pass-through) for input 1. The default is RGB pass-through.

Input Video Type #2 and #3

Rotate the horizontal Adjust ($\blacktriangleleft\triangleright$) knob while in the Input Video Type #2 and #3 submenu to select the appropriate video format (RGB pass-through, RGBcS, YUVi, YUVp) for input 2. The default for input 2 is YUVi.

Rotate the vertical Adjust (\blacktriangledown) knob while in the Input Video Type #2 and #3 submenu to select the appropriate video format (composite video, S-video) for input 3. The default for input 3 is composite video.

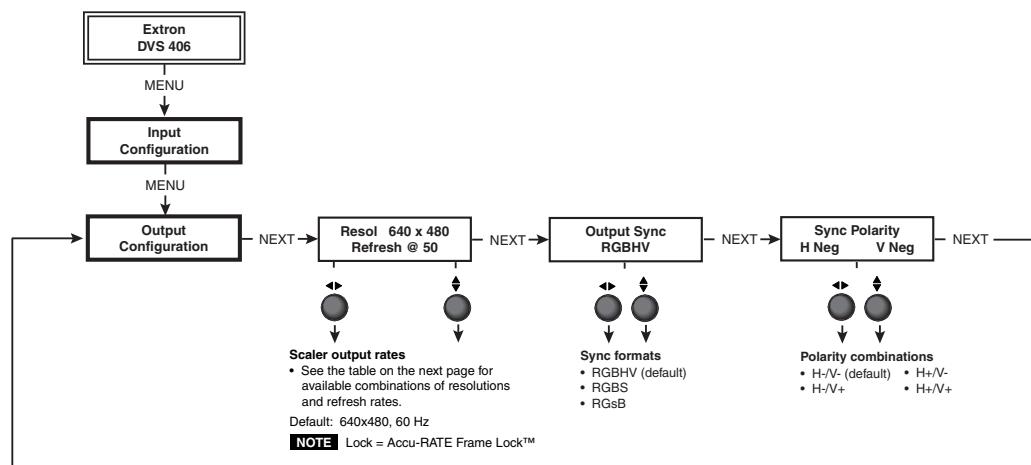
Input Video Type #4 and #5

Rotate the horizontal Adjust ($\blacktriangleleft\triangleright$) knob while in the Input Video Type #4 and #5 submenu to select the appropriate video format (composite video, S-video) for input 4. The default for input 4 is composite video.

Rotate the vertical Adjust (\blacktriangledown) knob while in the Input Video Type #4 and #5 submenu to select the appropriate video format (composite video, S-video) for input 5. The default for input 5 is composite video.

Output Configuration

The following flowchart provides an overview of the Output Configuration submenus and the options for each setting.



Resolution and refresh rates

Rotate the horizontal Adjust ($\blacktriangleleft\triangleright$) knob while in this submenu to select one of the available combinations of output resolutions and refresh (vertical scanning) rates.

Rotate the vertical Adjust (\blacktriangledown) knob while in this submenu to select one of the available refresh rates. Selecting Lock enables the Extron Accu-RATE Frame Lock (AFL) feature. Accu-RATE Frame Lock eliminates image tearing and other artifacts of scaling motion video by eliminating frame rate conversion. It exactly

Installation and Operation, cont'd

matches the output rate of the DVS 406's scaler to the frame rate of input 1. Select this feature if you will be using motion video sources with a display that is capable of a variety of refresh rates.

Available Scaler Output Resolutions and Rates						
Resolution	50 Hz	56 Hz	60 Hz	75 Hz	Lock @ 50/60*	True 72/100*
640 x 480	X		X**	X	X	X
800 x 600	X		X**	X	X	X
848 x 480	X		X**	X	X	X
852 x 480	X		X**	X	X	X
1024 x 768	X		X**	X	X	X
1280 x 768		X**			X	X
1280 x 1024	X		X**	X	X	
1360 x 765	X		X**	X	X	X
1365 x 1024	X		X**	X	X	
1400 x 1050	X		X**		X	
HDTV 480p			X**		X	
HDTV 576p	X**				X	
HDTV 720p			X**		X	
HDTV 1080p			X**		X	
HDTV 1080i	X		X**		X	
Resolution locked to input #1						

* Rate is auto-selected based on input.

** Default refresh rate

NOTE The default resolution and rate is 640 x 480 @ 60Hz.

Output Sync (RGB format)

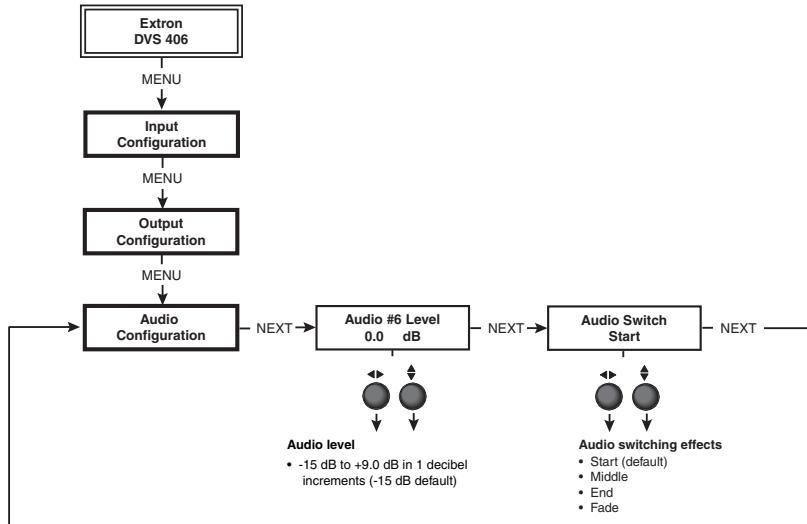
Using either the horizontal Adjust (\leftrightarrow) or vertical Adjust (\downarrow) knob, select the sync format required by the display: RGBHV, RGsB (sync on green), or RGBS (composite sync).

Sync Polarity

The display or projector may require a particular combination of horizontal (H) and vertical (V) sync signal polarities. Select the appropriate combination of positive or negative H and V sync by rotating either the horizontal Adjust (\leftrightarrow) or vertical Adjust (\downarrow) knob.

Audio Configuration

The following flowchart provides an overview of the Audio Configuration submenus and the options for each setting.



Audio Level

From this submenu, audio levels can be adjusted per input from -15 dB to +9 dB in 1 dB increments. This allows the signal to be boosted or trimmed to a consistent output level so that there is no noticeable difference in level when switching between inputs.

Using either the horizontal Adjust (\blacktriangleleft) or vertical Adjust (\blacktriangledown) knob, select the proper level of audio for the given input.

Audio Switch

When the video input signal is being switched, there are four methods for switching the audio:

- Start — switches to the next audio input at the beginning of the next video input.
- Middle — switches to the next audio input halfway into the next video input.
- End — switches to the next audio input at the end of the next video input.
- Fade — gradually mutes the current audio halfway between the switch to the new video input , then gradually increases the next audio input from mute.

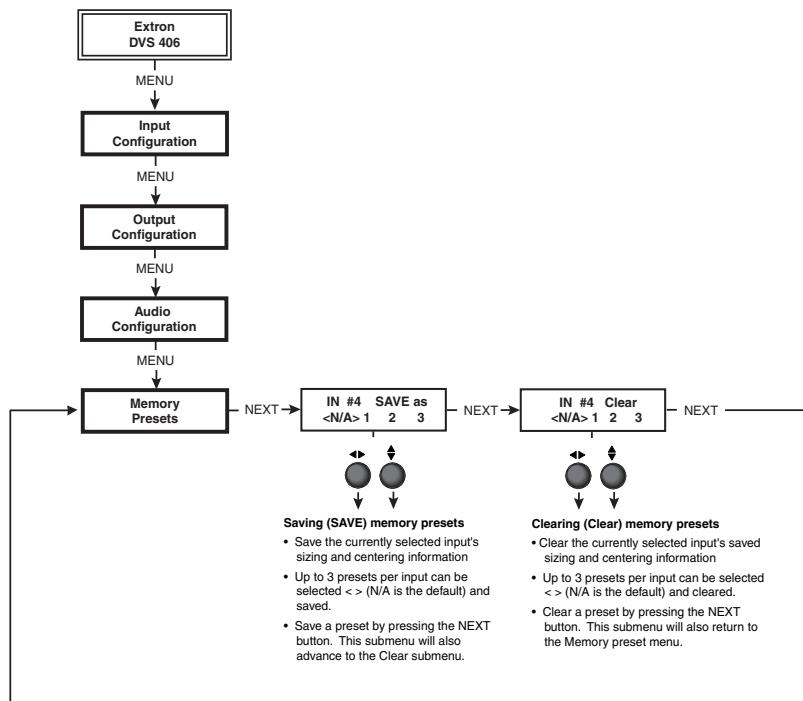
Use either the horizontal Adjust (\blacktriangleleft) or vertical Adjust (\blacktriangledown) knob to select the desired audio switching effect.

Memory Presets

The following flowchart provides an overview of the Memory Presets submenus and the options for each setting.

NOTE The presets will only save the Sizing and Centering information, and not for the pass-through inputs, i.e. input 1 and RGBp from input 2.

Installation and Operation, cont'd



Save (SAVE) memory presets

From this submenu, the sizing and centering information for the currently selected input can be saved to memory. Up to three memory presets can be saved per input: presets 1, 2, and 3.

Using either the horizontal Adjust (↔) or vertical Adjust (↕) knob, select (<>) either N/A, 1, 2, or 3 to select a preset. The default is <N/A>. To save the preset, press the NEXT button.

Clear memory presets

From this submenu, up to three saved presets for the currently selected input can be cleared from memory.

Using either the horizontal Adjust (↔) or vertical Adjust (↕) knob, select (<>) either N/A, 1, 2, or 3 to select a preset. The default is <N/A>. To clear the preset, press the NEXT button.

Recalling a preset

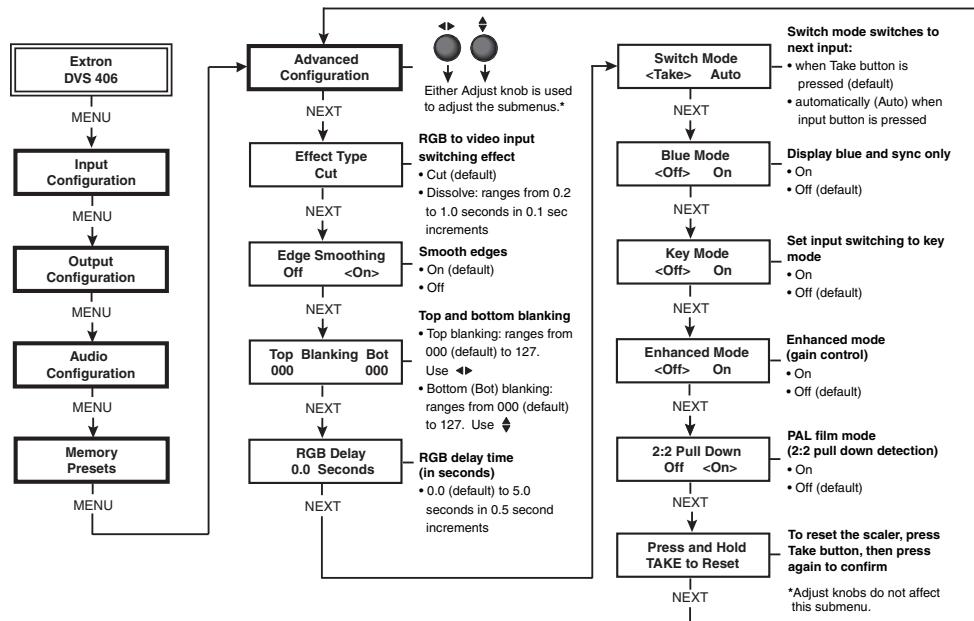
Recalling an input's saved preset requires that the input be selected and that the input button be then pressed successively to recall any saved preset (up to three saved presets). The available presets are sequentially selected in a loop*: preset 1, preset 2, preset 3, preset 1, preset 2, and so forth, depending on which presets are available.

Each saved preset will display the LCD message "Input #X Memory Y" where "X" refers to the input (2 to 6) and "Y" refers to the preset (1 to 3). The absence of any saved presets will not display the LCD message for the missing preset.

* The actual presets will depend on what presets (1, 2, or 3) have been saved for an input. For example, if only presets 1 and 3 are available, the sequential looping of the presets as the input button is repeatedly pressed, will be: preset 1, preset 3, preset 1, preset 3, and so forth.

Advanced Configuration

The following flowchart provides an overview of the Advanced Configuration submenus and the options for each setting.



Effect type

From this submenu, the RGB to video input switching effect is selected. The two effects are cut and dissolve. A cut instantaneously switches from one input to another. A dissolve causes one input to fade out while fading in another selected input. The dissolve effect duration is adjustable. For these effects to occur, the initial input must be on input 1 with the output resolution locked to input 1 (“Resol Lock to #1”). See the “Output Configuration” section in this chapter for instructions on locking the resolution.

Using either the horizontal Adjust (\blacktriangleleft) or vertical Adjust (\blacktriangledown) knob, select either cut or dissolve. The default is cut. The dissolve effect has a switch transition period which is adjustable from 0.2 seconds to 1.0 seconds in 0.1 second increments. Attempting to adjust the period below 0.2 seconds will return to the cut effect. Pressing the Take button after selecting a second input will initiate the switching effect between input 1 and the selected input.

Edge smoothing

This submenu features edge smoothing. Edge smoothing smooths edges of a picture by minimizing the differences between pixels.

Using either the horizontal Adjust (\blacktriangleleft) or vertical Adjust (\blacktriangledown) knob, select either "On" or "Off". The default is "On".

Top and bottom blanking (blanking adjustment)

To remove noise or extraneous material such as closed captioning by removing scan lines at either the top or bottom of the screen, adjust the top blanking or bottom blanking. Rotate the horizontal Adjust (\blacktriangleleft) knob to set the number of lines removed from top of the picture. Rotate the vertical Adjust (\blacktriangledown) knob to set the number of lines removed from the bottom.

Both the top and bottom blanking adjustments range from 0 to 127, with the default setting being set to 0 for either adjustment.

Installation and Operation, cont'd

RGB delay (Triple-Action Switching)

With Triple-Action Switching, the DVS 406 switches to the new sync signal before switching RGB (video) signals. That allows the display device to adjust to the new sync timing after a brief delay (during which the display is blanked) before displaying the new picture, which will appear without glitches. Triple-Action Switching is also known as video mute switching.

Use the horizontal Adjust (\leftrightarrow) knob or vertical Adjust (\downarrow) knob to select the blanking period (RGB delay time) from 0 seconds (default) to 5 seconds in 0.5 second steps.

Switch mode

From this submenu, the input switching method may be selected. The two choices are Take (default), which requires the Take button to be pressed to initiate the switch, and Auto, which causes the switch to occur as soon as the selected input button is pressed.

Use either the horizontal Adjust (\leftrightarrow) or vertical Adjust (\downarrow) knob to specify the switch mode.

Blue mode

To aid in setup of the scaler's color and tint, the Blue mode can be set from this submenu to "On" so that only sync and blue video signals will be passed to the display. Use either the horizontal Adjust (\leftrightarrow) or vertical Adjust (\downarrow) knob to specify this mode. The default is "Off".

Key mode

Key mode allows input 1 to be displayed simultaneously with any other selected input. The effect resembles two images being displayed in a one-over-the-other fashion.

From this submenu, use either the horizontal Adjust (\leftrightarrow) or vertical Adjust (\downarrow) knob to specify this mode as "On" or "Off". The default is "Off". Key mode allows two inputs to be displayed simultaneously, one over the other.

After setting the Key mode to "On", initiate the Key mode effect by doing the following:

1. Select the input button of the image which will be displayed with input 1, then set the output resolution as locked to input 1. See the "Output Configuration" section in this chapter for instructions on locking the resolution.
2. Select the Take button.

NOTE *The previously described Switch mode must be set to Take in order for the Take button to be enabled.*

3. Select the input 1 button twice. The Key mode effect will now occur.
4. To escape from the Key mode effect, press any input button.

Enhanced mode

When the Enhanced mode is set "On", automatic gain control of the video input signal is enabled. If the input signal level is too weak, the signal gain will be increased, and if the input signal level is excessive, the signal gain will be decreased.

From this submenu, use either the horizontal Adjust (\leftrightarrow) or vertical Adjust (\downarrow) knob to specify this mode as "On" or "Off". The default is "Off".

NOTE The Enhanced mode will only be effective on composite and S-video input signals.

2:2 Pulldown detection (PAL film mode detect)

For the currently selected input, set this feature “On” if the source is PAL video that originated in film. For standard PAL video sources, such as cameras, set this feature to “Off” (default).

NOTE This feature does not apply to NTSC video sources since film mode (3:2 pulldown) is automatically detected for those signals.

Use either the horizontal Adjust (↔) or vertical Adjust (↑) knob to specify this mode.

Reset

The scaler can be reset to the default values by depressing and holding the Take button from this submenu. Release the button after receiving the “Press TAKE to Confirm Reset” message (about 2 seconds), then press Take again to reset the scaler. The message “Unit Reset to Factory Defaults” will then be displayed.

Exit Menu

From this submenu, press the Next button to return to the Default menu cycle, or press the Menu button to return to the Input Configuration menu.

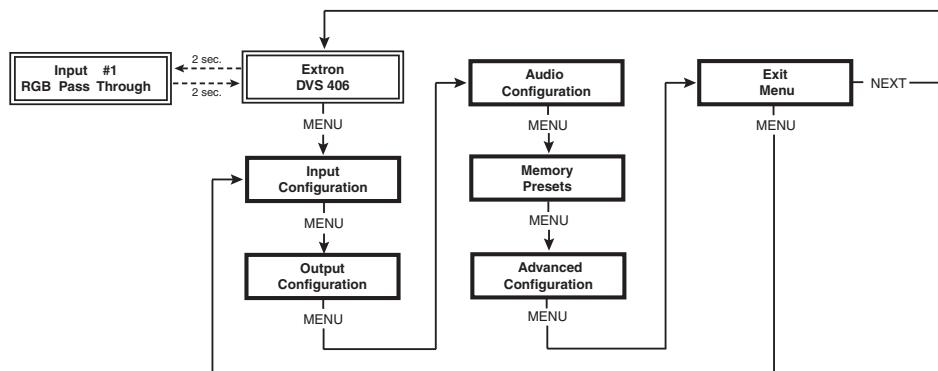


Image Adjustments

Image adjustments apply to scaled video output only; RGB signals are passed through without adjustments. Sizing and centering image adjustments can be stored in memory as a preset (see the “Memory Presets” section in this chapter) and can be set separately for each input.

Color, tint, brightness, contrast, detail, sizing, centering

To adjust an image for color, tint, brightness, contrast, detail, sizing, or centering follow the steps below. An example of making color adjustments, shown in the following flowchart, demonstrates the process, which is the same for all the image adjustments.

1. Press the input selection button of the input you wish to adjust.
2. Press the appropriate image adjustment button (Color/Tint, Brightness/Contrast, Detail/Sharpness, Sizing, and Centering). The LCD display will show the name of the adjustment and the number of the current setting.
3. Rotate the horizontal Adjust knob (↔) or vertical Adjust knob (↑) to select a level from the following adjustment ranges:

Installation and Operation, cont'd

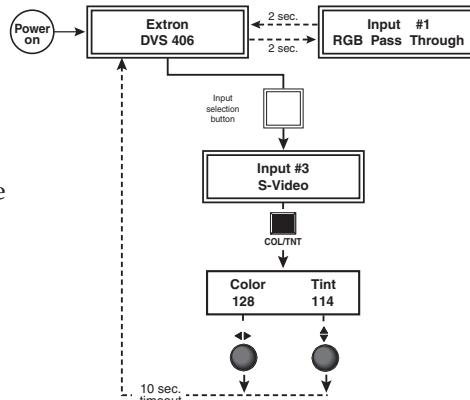
NOTE The Adjust knobs have no mechanical limits to their rotation.

- Color and Tint (Col/Tnt): 0 to 255
- Brightness and Contrast (Brt/Cont): 0 to 255
- Detail and Sharpness (Det): 0 to 63
- Sizing (Size)*
- Centering (Center): -128 to 127

The scaler will time-out to the default menu after 10 seconds.

* Rotating the Adjust knobs counterclockwise will increase the horizontal or vertical sizing, and rotating the knobs clockwise will decrease the horizontal and vertical sizing. The visual indicator on the LCD will stop moving when the sizing limit has been reached.

4. Repeat steps 2 and 3 for each image adjustment to be made for that input.



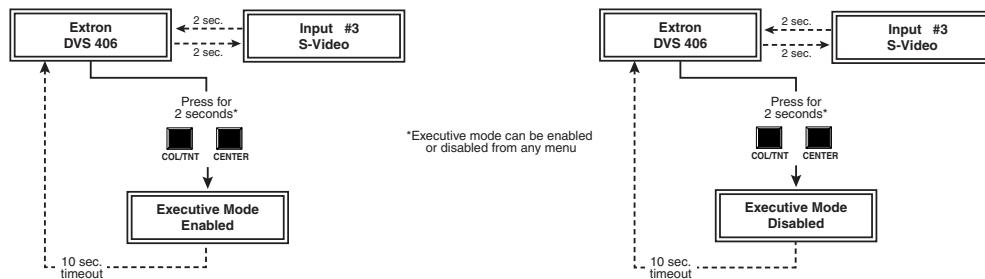
NOTE The horizontal Adjust knob and the vertical Adjust knob are used to adjust the image settings on the left and right sides of the LCD screen, respectively.

NOTE The LCD display may show that an adjustment is "Not Available" in place of a number if that adjustment doesn't apply to the input's video format. For example, the image adjustments do not apply to RGB pass-through inputs, so "Not Available" will be displayed if the Tint button is pressed when an RGB pass-through input is selected.

Front Panel Security Lockout

To prevent accidental changes to settings, press the Col/Tnt and Center buttons simultaneously for 2 seconds to lock the DVS 406's front panel. The lock mode locks all front panel functions except input selection and the Take button. The menu system will still return to the Default menu when 10 seconds have elapsed after pressing any button other than input selection or the take button. The DVS 406's front panel and the IR 901 are both affected by the lock mode. When the lock mode is active, all functions and adjustments can still be made through RS-232 control. For details on RS-232 control, see chapter three.

To disable the lock mode, press the Col/Tnt and Center buttons simultaneously for 2 seconds.



IR 901 Infrared Remote Control

The optional IR 901, shown at right, replicates all of the front panel controls except the Menu and Next buttons. Unless front panel lock mode is enabled, adjustments can be made from the IR 901, but you must use the DVS 406's front panel or the Windows-based control program (via an RS-232 device) to configure and program the scaler. See chapter three, "Serial Communication", for details.

The topmost part of the IR 901 features three Aspect Ratio Preset buttons, a Freeze button, the six input selection buttons, and the Take button. The middle portion of the IR 901 features the size and centering buttons. The bottom part contains the adjustment controls for color, tint, brightness, contrast, detail, and sharpness adjustments. The adjustment functions will be disabled if the front panel lock mode is on.

Selecting an input

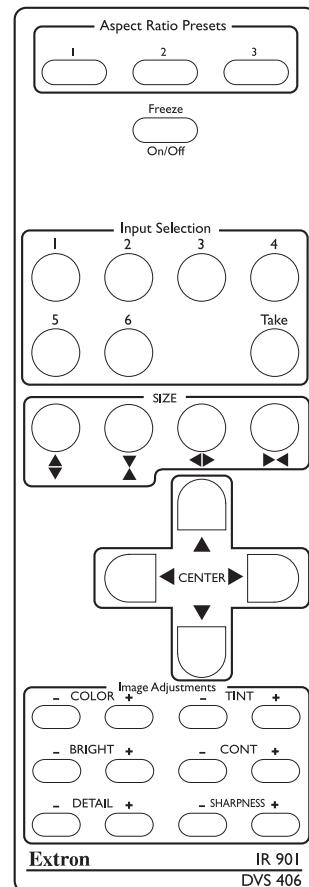
To use the IR 901 to select an input, press the input number. When selecting a subsequent input, select the input, then press the Take key. For example, if input 1 is currently selected, but input 2 is desired, press the input 2 button, then press Take. The DVS 406 will switch to input 2.

Freezing an input

To freeze the input being displayed, press the Freeze On/Off key. To unfreeze the input, press the Freeze key again.

Selecting a preset

Any saved memory presets for an input (up to three) may be recalled by pressing one of the three Aspect Ratio Preset buttons. Sizing and centering information are saved with the presets. See "Memory Presets" previously mentioned in this chapter.



Installation and Operation, cont'd

Troubleshooting

This section gives recommendations on what to do if you have problems operating the DVS 406, and it provides examples and descriptions for some image problems you might encounter.

The following are some tips to help you in troubleshooting.

1. Some symptoms may resemble others, so you may want to look through all of the examples before attempting to solve the problem.
2. Be prepared to backtrack in case the action taken doesn't solve the problem.
3. It may help to keep notes and sketches in case the troubleshooting process gets lengthy. This will also give you something to discuss if you call for technical support.
4. Try simplifying the system by eliminating components that may have introduced the problem or made it more complicated.
5. For sync-related problems: Portable digital projectors are designed to operate close to the video source. Sync problems may result from using long cables or from improper termination. A sync adapter, such as Extron's ASTA (active sync termination adapter), may help solve these problems.
6. For LCD and DLP projectors and plasma displays: In addition to the sync-related information above, check the user's manual that came with the projector for troubleshooting tips, as well as for settings and adjustments. Each manufacturer may have its own terms, so look for terms like "auto setup", "auto sync", "pixel phase", and "tracking".

Operating Problems

The table below shows some common operating problems and their solutions.

Problem	Cause	Solution
No image appears.	The input signal is incompatible.	Attach an input device that is compatible with NTSC 3.58, NTSC 4.43, PAL, or SECAM.
	Freeze mode was entered when the image was black.	Deactivate freeze mode
	The scaled output rate is too high for the display.	Change the scaled output to a compatible resolution.
The image is frozen.	Freeze mode is on.	Deactivate freeze mode. If that does not work, unplug the power cord from the scaler, then plug it back in.
The image is flashing.	The scaled output rate is too high for the display.	Change the scaled output to a compatible resolution.
Inputs cannot be switched using the Take button	Switch mode is set to Auto.	Set Switch mode to Take.

Problem	Cause	Solution
Picture controls are not active.	Input 1 is selected.	Switch to input 2–6. Input 1 is pass-through only.
The image is green.	The output sync is configured for sync on green.	Turn off sync on green.
The image is too soft.	The detail/sharpness level needs to be changed.	Change the detail/sharpness.

Installation and Operation, cont'd



DVS 406

3

Chapter Three

Serial Communication

RS-232 Programmer's Guide

Control Software for Windows

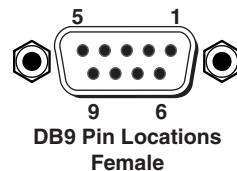
Serial Communication

The DVS 406 can be remotely controlled via a host computer or other device (such as a control system) attached to the rear panel RS-232 connector. The control device (host) can use either Extron's Simple Instruction Set (SIS) commands or the graphical control program for Windows.

The scaler uses a protocol of 9600 baud, 1 stop bit, no parity, and no flow control.

The rear panel RS-232 9-pin D connector has the following pin assignments:

Pin	RS-232 function	Description
1	-	No connection
2	Tx	Transmit data
3	Rx	Receive data
4	-	No connection
5	Gnd	Signal ground
6	-	No connection
7	-	No connection
8	-	No connection
9	hardwired IR	IR input



RS-232 Programmer's Guide

Host-to-scaler communications

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command sequence. When the DVS 406 determines that a command is valid, it executes the command and sends a response to the host device. All responses from the scaler to the host end with a carriage return and a line feed (CR/LF = ↴), which signals the end of the response character string. A string is one or more characters.

It is also possible to send several SIS commands back-to-back in sequence.

Scaler-initiated messages

When a local event such as a front panel selection or adjustment takes place, the DVS 406 scaler responds by sending a message to the host. No response is required from the host. The scaler-initiated messages are listed here (underlined).

(C) Copyright 2002, Extron Electronics, DVS 406, Vx.xx ↴

The DVS 406 sends the copyright message when it first powers on. Vx.xx is the firmware version number.

Error responses

When the scaler receives a valid SIS command, it executes the command and sends a response to the host device. If the DVS 406 is unable to execute the command because the command is invalid or it contains invalid parameters, it returns an error response to the host.

The error response codes and their descriptions are as follows:

E01 – Invalid input channel number (the number is too large)

E10 – Invalid command

E11 – Invalid preset number

E13 – Invalid value (the number is out of range/too large).

E17 – Illegal command for this signal type.

Using the command/response tables

The command/response tables on the next page list valid command ASCII codes, the scaler's responses to the host, and a description of the command's function or the results of executing the command. *Except* when setting audio gain/attenuation, detail, and sharpness, upper and lower case characters may be used interchangeably in the command field.

The ASCII to HEX conversion table at left is for use with the command/response tables.

ASCII to HEX Conversion Table															
20	!	21	"	22	#	23	\$	24	%	25	&	26	'	27	
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F

ASCII to Hex conversion table

The command/response tables use symbols (defined below) to represent variables.

Symbol definitions

- ← = CR/LF (carriage return/line feed) (hex 0D 0A)
- = Space
- Esc** = Escape key
- X1** = Specific input number (1 through 6)
1 = input 1, 2 = input 2, and so forth
- X2** = 0 = off, 1 = on
- X4** = Video signal type (1 through 8)
 - 1 = RGB pass-through
 - 2 = YUV pass-through
 - 3 = RGBcS
 - 4 = YUVi, interlaced
 - 5 = YUVp, progressive
 - 6 = composite video
 - 7 = S-video
 - 8 = SDI (serial digital interface)
- X6** = Audio gain (0 through 9) in 1 dB steps
- X7** = Audio attenuation (1 through 15) in 1 dB steps
- X8** = Controller firmware version (listed to two decimal places e.g.: x.xx)
- X9** = Numeric value (-15 through +9) in dB
- X10** = Picture adjustment range (0 through 255)
- X11** = Scaler resolution

1 = 640x480	9 = 1365x1024
2 = 800x600	10 = 1400x1050
3 = 848x480	11 = 480p
4 = 852x480	12 = 576p
5 = 1024x768	13 = 720p
6 = 1280x768	14 = 1080p
7 = 1280x1024	15 = 1080i
8 = 1360x765	16 = Lock to input 1*
- X12** = Detected input signal standard (0 through 4)
 - 0 = none
 - 1 = NTSC 3.58
 - 2 = PAL
 - 3 = NTSC 4.43
 - 4 = SECAM
 - = not applicable (occurs when the input is set for RGB, YUV, or progressive YUV)
- X13** = Detail level (0 through 63)
- X16** = Executive mode status (0 through 2)
 - 0 = disabled (executive mode off, normal mode on)
 - 1 = enabled, image adjustments are locked
- X17** = Blanking adjustment range (0 through 127 lines)
- X18** = Sharpness level (0 through 63)
- X19** = Input configuration preset (1 through 3)
- X20** = Scaler refresh rate
 - 1 = 50 Hz
 - 2 = 56 Hz (1280x768 only)
 - 3 = 60 Hz
 - 4 = 75 Hz
 - 5 = AFL* (50 Hz for PAL or 59.94 Hz for NTSC)
 - 6 = True rate (72 Hz for NTSC or 100 Hz for PAL)
 - 7 = not applicable

* **NOTE** Lock or AFL is Accu-RATE Frame Lock™

Serial Communication, cont'd

Command/response table for SIS commands

Command	ASCII Command (host to scaler)	Response (scaler to host)	Additional description
Input selection			
Select both video and audio	X1 !	Cxx X1 ↲	Video & audio input X1.
Example:	3!	Cxx3 ↲	Example: select input 3 video & audio
Select audio only	X1 \$	Axx X1 ↲	Audio input X1.
Select video only	X1 &	Vxx X1 ↲	Video input X1.
Take			
Switch to selected audio & video inputs	%	Tke0 ↲	Switch to selected audio & video inputs.
Switch to selected video only	1%	Tke1 ↲	Switch to selected video input.
Switch to selected audio only	2%	Tke2 ↲	Switch to selected audio input.
Memory preset			
Recall input configuration preset	X19.	Rpre X19 ↲	Recall input preset X19.
Save input configuration preset	X19,	Spre X19 ↲	Save to input preset X19.
Audio gain/attenuation			
Set audio gain	X6 G	Aud=X6 ↲	Set a single input's gain (in dB).
Example:	9G	Aud=+9.0 ↲	Example: set gain to +9 dB.
Set audio attenuation	X7 g	Aud=X7 ↲	Set an input's attenuation (in dB).
Example:	8g	Aud=-8.0 ↲	Example: set attenuation to -8 dB.
View audio channel level	G	Aud=X8 ↲	Show an input's audio level.
Audio mute			
Mute on	1Z	Amt X2 ↲	Mute both audio outputs.
Example:	1Z	Amt1 ↲	
Mute off	0Z	Amt X2 ↲	Unmute all audio outputs.
View audio mute status	Z	Amt X2 ↲	Show the status of audio mute.
Video mute			
Mute on	1B	Vmt X2 ↲	Mute video output.
Example:	1B	Vmt1 ↲	
Mute off	0B	Vmt X2 ↲	Unmute video output.
View video mute status	B	Vmt X2 ↲	Show the status of video mute.
Video/audio mute			
Mute on	1B1Z	Vmt X2 ↲ Amt X2 ↲	Mute video & audio output.
Example:	1B1Z	Vmt1 ↲ Amt1 ↲	
Mute off	0B0Z	Vmt X2 ↲ Amt X2 ↲	Unmute video & audio output.
View video/audio mute status	BZ	Vmt X2 ↲ Amt X2 ↲	Show video/audio mute status.
Video configuration			
Set video signal type	X1*X4\	X1 Typ X4 ↲	Set the input signal type. (Type = RGB, YUV, RGBs, YUVi, YUVp, video, S-video, or SDI)
Example:	2*4\	2Typ4 ↲	Example: set input 2 to 4 (YUVi).
View the video signal type	X1\	X1 Typ X4 ↲	Show the video signal type.
Example:	5\	5Typ1 ↲	Example: show input 5 video type.
Color			
Set a specific color value	X10 C	Col X10 ↲	Specify a color adjustment level.
Example:	47C	Col047 ↲	Example: set the color adjustment to 47.
Increment	+C	Col X10 ↲	Increase color adjustment level.

Command/response table for SIS commands (continued)

Command	ASCII Command (host to scaler)	Response (scaler to host)	Additional description
Decrement	-C	Col X10 ↲	Decrease color adjustment level.
View the color value	C	Col X10 ↲	Show the color adjustment.
Tint			
Set a specific tint value <i>Example:</i> 176T	X10 T 176T	Tin X10 ↲ Tin176 ↲	Specify a tint adjustment level. <i>Example:</i> set the tint to 176.
Increment	+T	Tin X10 ↲	Increase tint adjustment level.
Decrement	-T	Tin X10 ↲	Decrease tint adjustment level.
View the tint value	T	Tin X10 ↲	Show the tint adjustment.
Contrast			
Set a specific contrast value	X10 ^	Con X10 ↲	Specify the contrast adjustment.
Increment	+^	Con X10 ↲	Increase the contrast.
Decrement	-^	Con X10 ↲	Decrease the contrast.
View the contrast value	^	Con X10 ↲	Show the contrast setting.
Brightness			
Set a specific value	X10 Y	Brt X10 ↲	Specify the brightness adjustment.
Increment	+Y	Brt X10 ↲	Increase the brightness.
Decrement	-Y	Brt X10 ↲	Decrease the brightness.
View the brightness value	Y	Brt X10 ↲	Show the brightness setting.
Detail mode			
Set the detail level	X13 D	Det X13 ↲	Specify the detail level.
View the detail value	D	Det X13 ↲	Show the detail setting.
Sharpness mode			
Set the sharpness level	X18 d	Shp X18 ↲	Specify the sharpness level.
View the sharpness value	d	Shp X18 ↲	Show the sharpness setting.
Horizontal shift			
Set horizontal position	X10 H	Hph X10 ↲	Specify the horizontal position.
Increment	+H	Hph X10 ↲	Shift right.
Decrement	-H	Hph X10 ↲	Shift left.
View the horizontal pos. value	H	Hph X10 ↲	Show the horizontal position.
Vertical shift			
Set the vertical position	X10 /	Vph X10 ↲	Specify the vertical position.
Increment up	+ /	Vph X10 ↲	Shift up.
Increment down	- /	Vph X10 ↲	Shift down.
View the vertical pos. value	/	Vph X10 ↲	Show the vertical position.
Horizontal size			
Increase the horizontal size	+:	Hsz + ↲	Widen the picture.
Decrease the horizontal size	-:	Hsz - ↲	Make the picture narrower.
Vertical size			
Increase the vertical size	+	Vsz + ↲	Make the picture taller.
Decrease the vertical size	-;	Vsz - ↲	Make the picture shorter.

(Continued)

Serial Communication, cont'd

Command/response table for SIS commands (continued)

Command	ASCII Command (host to scaler)	Response (scaler to host)	Additional description
Top blanking			
Specify a top blanking value	[X17] (	Blt [X17] ↵	Set the number of lines to blank at the top of the picture.
Increase the top blanking value	+ (	Blt [X17] ↵	Increase the # of top lines blanked.
Decrease the top blanking value	- (	Blt [X17] ↵	Decrease the # of top lines blanked.
View the top blanking value	(	Blt [X17] ↵	Show the number of lines that are blanked at the top of the picture.
Bottom blanking			
Specify a bottom blanking value	[X17])	Blb [X17] ↵	Set the number of lines to blank at the bottom of the picture.
Increase the bottom blanking value	+)	Blb [X17] ↵	Increase the number of lines blanked at the bottom.
Decrease bottom blanking value	-)	Blb [X17] ↵	Decrease the number of bottom lines blanked.
View the bottom blanking value	)	Blb [X17] ↵	Show the # of bottom lines that are blanked.
Scaler rate			
Set the output rate	[X11] * [X20] =	Rte [X11] * [X20] ↵	Select a scaler output scan rate.
View the output rate	=	Rte [X11] * [X20] ↵	Show the scaler output rate.
Freeze			
Enable	1F	Frz1 ↵	Output a "frozen" video image.
Disable	0F	Frz0 ↵	Turn off freeze (output motion).
View the freeze status	F	Frz [X2] ↵	Show the freeze status.
<i>Example:</i>	F	Frz0 ↵	
Front panel security lockout			
Disable	0X	Exe0 ↵	Adjustments & selections can be made from the front panel.
Enable (lock image adjustments)	1X	Exe1 ↵	Lock front panel adjustments; adjust image via RS-232 only.
View the executive mode status	X	Exe [X16] ↵	Show executive mode status.
<i>Example:</i>	X	Exe0 ↵	
Firmware version, part number & information requests			
Query firmware version number	Q	Ver [X8] ↵	Show the controller firmware version.
Request part number	N	N60-363-0_ ↵	Show the scaler's part #.
Request general info.	I	(See below)	Show the scaler's status.
		Vid[X1]•Vxx[X1]•Aud[X1]•Axx[X1]•Typ[X4]•Std[X12]•Key[X2]•Pre[X19] ↵	where Vid is the current input and Vxx is the new input
Zap (reset to default settings)			
Zap audio levels to 0dB	[Esc] zA	ZapA ↵	Reset all audio levels to 0dB.
Zap image adjustments/controls	[Esc] zI	ZapI ↵	Reset the image adjustments to factory settings.
Zap all DVS 406 settings/memories	[Esc] zXXX	ZapXXX ↵	Reset everything: all settings, and adjustments to the factory default.

The syntax for setting a special function is $\text{[x?]} * \text{[x!]} \#$ where [x? is the function number and [x!] is the value. To view a function's setting, use $\text{[x?}\#$ where [x? is the function number. In the following table the values of the [x? variable are different for each command/function. These values are given in the rightmost column.

Command/response table for special function SIS commands

Command	ASCII Command (host to scaler)	Response (scaler to host)	[x! values and additional descriptions
Delay times			
RGB delay (Triple-Action Switching)	$3 * \text{[x!} \#$	RGB $\text{[x!} \leftarrow$	$0 = 0.0$ seconds (default), $1 = 0.5$ seconds, $2 = 1.0$ seconds, ... in $\frac{1}{2}$ second steps up to $10 = 5.0$ seconds
<i>Example:</i>	$3*7\#$	RGB07 \leftarrow	<i>Example:</i> 3.5 second RGB delay
Input switch effects			
Switching effect	$4 * \text{[x!} \#$	Eff $\text{[x!} \leftarrow$	$0 = \text{cut}$, $1 = \text{key}$, $2 = \text{dissolve}, 0.2$ seconds, $3 = \text{dissolve}, 0.3$ seconds, ... in 0.1 second steps up to $10 = \text{dissolve}, 1.0$ seconds
<i>Example:</i>	$4*3\#$	Eff03 \leftarrow	<i>Example:</i> 0.3 second dissolve
Scaler settings			
Scaler output sync format	$6 * \text{[x!} \#$	Syn $\text{[x!} \leftarrow$	$0 = \text{RGBHV}$ (default) $1 = \text{RGBS}$ $2 = \text{RGsB}$ (sync on green, SOG)
<i>Example:</i>	$6*1\#$	Syn1 \leftarrow	<i>Example:</i> RGBHV sync output
Scaler output polarity	$7 * \text{[x!} \#$	Pol $\text{[x!} \leftarrow$	$0 = \text{H-}/\text{V-}$ (default) $1 = \text{H-}/\text{V+}$ $2 = \text{H+}/\text{V-}$ $3 = \text{H+}/\text{V+}$
<i>Example:</i>	$7*1\#$	Pol1 \leftarrow	<i>Example:</i> H-/V+ sync polarity
Blue screen			
Blue screen (blue & sync output only)	$8 * \text{[x!} \#$	Blu $\text{[x!} \leftarrow$	$0 = \text{off}$ (default) (RGB & sync output) $1 = \text{on}$ (blue video & sync output only)
<i>Example:</i>	$8*1\#$	Blu1 \leftarrow	<i>Example:</i> blue & sync output for setup
Key effect			
Key mode	$9 * \text{[x!} \#$	Key $\text{[x!} \leftarrow$	$0 = \text{off}$ (default) $1 = \text{on}$
<i>Example:</i>	$9*1\#$	Key1 \leftarrow	<i>Example:</i> enable the key effect.
Edge smoothing			
Edge enhancement	$16 * \text{[x!} \#$	Fil $\text{[x!} \leftarrow$	$0 = \text{off}$ $1 = \text{on}$ (default)
<i>Example:</i>	$16*1\#$	Fil1 \leftarrow	<i>Example:</i> enable edge smoothing.
Enhancement mode			
Edge enhancement	$12 * \text{[x!} \#$	Enh $\text{[x!} \leftarrow$	$0 = \text{off}$ (default) $1 = \text{on}$
<i>Example:</i>	$12*1\#$	Enh1 \leftarrow	<i>Example:</i> enable enhanced mode.
PAL film mode (2:2 pulldown detection)			
PAL film mode detection	$18 * \text{[x!} \#$	Flm $\text{[x!} \leftarrow$	$0 = \text{off}$ (default) $1 = \text{on}$
<i>Example:</i>	$18*0\#$	Flm0 \leftarrow	<i>Example:</i> disable PAL film mode.

Serial Communication, cont'd

Control Software for Windows

The included Extron DVS 406 Control Program for Windows offers another way to control the DVS 406 via RS-232 connection in addition to the Simple Instruction Set commands. The control program's graphical interface includes the same functions as those on the scaler's front panel and some additional features that are only available through the Windows-based software.

The control software is compatible with Windows 95/98, Windows NT, Windows 2000, and Windows XP. Extron's DVS 406 Control Program is included with the DVS 406, and updates can be downloaded from the Extron Web site (<http://www.extron.com>).

Installing the software

The control program is contained on a CD, and it requires approximately 2 MB (megabytes) of hard disk space.

To install the software on the hard drive:

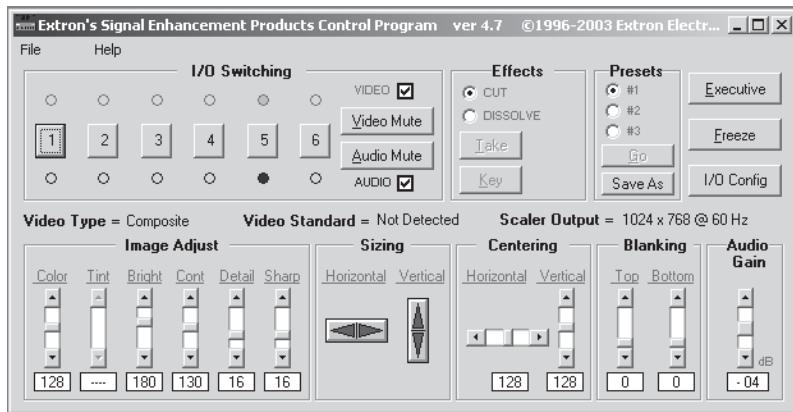
1. Run SETUP.EXE from the CD.
2. Follow the instructions that appear on the screen.

By default the installation creates a C:\DVS 406 directory, and it places two icons (DVS 406 Control Pgm and DVS 406 Help) into a group or folder named "Extron Electronics".

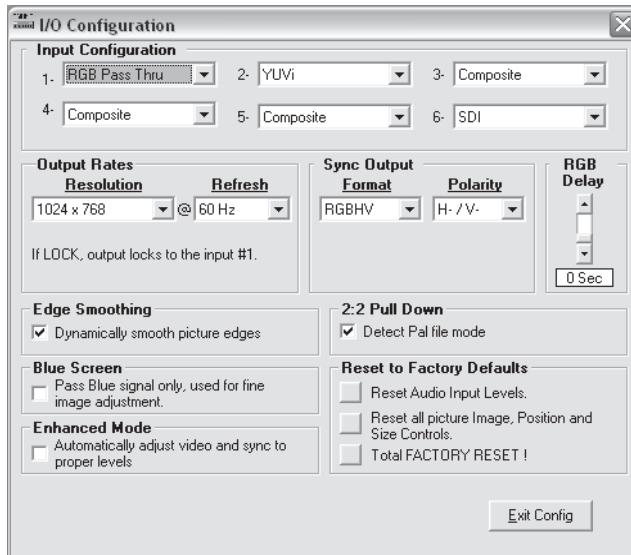
Using the control program

Many items found in the DVS 406 Control Program are also accessible via front panel controls and the LCD menus described in chapter two. Refer to chapter two for details on features and settings. The DVS 406 Help Program provides information on settings and on how to use the control program itself. Some features, including the miscellaneous options, are only available via this control program. These features are described in the sections of this chapter that correspond to the parts of the control program where the features are found.

1. To run the control program, double-click on the DVS 406 Control Pgm icon in the Extron Electronics group or folder. The Comm menu appears on the screen.
2. Click on the comm port that is connected to the DVS 406's RS-232 port. The Extron DVS 406 Control Program windows appear.



3. Click on the I/O Config button to configure the inputs from the I/O Configuration Window.



Using the help program



For information on program features, press the F1 computer key, or click on the Help menu from within the DVS 406 Control Program, or double-click on the DVS 406 Help icon in the Extron Electronics group or folder.

For explanations of buttons or functions, click on the tabs in the help screen to reach the desired screen. Use a mouse or the Tab and Enter keys to select a button/function. A description and tips on using the program will appear on screen.

Serial Communication, cont'd



DVS 406

A

Appendix

Appendix

Specifications

Part Numbers and Accessories

Firmware Upgrade Installation

Audio Card Installation

Serial Digital Interface (SDI) Card Installation

Appendix

Specifications

Video input

Number/signal type	1 RGBHV, RGBS, RGsB pass-through, HD component video color space 1 RGBHV, RGBS, RGsB pass-through, progressive/interlaced component video 3 S-video, composite video 1 SDI (optional)
Connectors	1 x 5 BNC female (pass-through, HD color space) 1 x 5 BNC female (pass-through, progressive/interlaced) 3 x 2 BNC female (S-video, composite video) 1 BNC female (SDI – optional)
Nominal level	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB 0.3 Vp-p for U and V of component video, and for C of S-video
Minimum/maximum levels	Analog: 0.0 V to 2.0 Vp-p with no offset
Impedance	75 ohms
Horizontal frequency	NTSC, PAL, NTSC 4.43, SECAM
Vertical frequency	NTSC, PAL, NTSC 4.43, SECAM
Resolution range	NTSC, PAL, NTSC 4.43, SECAM
Return loss	<-30 dB @ 5 MHz
DC offset (max. allowable)	1.5 V

Video processing

Decoder	9 bit digital
Digital sampling	24 bit, 8 bits per color; 13.5 MHz (interlaced signals) 24 bit, 8 bits per color; 27 MHz (480p signals)
Colors	16.78 million

Video output

Number/signal type	2 RGBHV, RGBS, RGsB
Connectors	(1) 15-pin HD female 1 x 5 BNC female
Nominal level	0.7 Vp-p for RGB
Minimum/maximum levels	0 V to 0.7 Vp-p
Impedance	75 ohms
Scaled resolutions	640x480 ^{1,3,4,5,6} , 800x600 ^{1,3,4,5,6} , 848x480 ^{1,3,4,5,6} , 852x480 ^{1,3,4,5,6} , 1024x768 ^{1,3,4,5,6} , 1280x768 ^{2,5,6} , 1280x1024 ^{1,3,4,5} , 1360x765 ^{1,3,4,5,6} , 1365x1024 ^{1,3,4,5} , 1400x1050 ^{1,3,5} , HDTV 480p ^{3,5} , 576p ^{1,5} , 720p ^{3,5} , 1080p ^{3,5} , and 1080i ^{1,3,5}
¹	= at 50 Hz ² = at 56 Hz ³ = at 60 Hz ⁴ = at 75 Hz
⁵	= locked to the current input's vertical refresh rate (Accu-RATE Frame Lock)
⁶	= True Rate
Return loss	-30 dB @ 5 MHz
DC offset	±5 mV maximum with input at 0 offset
Switching type	Triple-Action, seamless between RGB input #1 and video

Sync

Input type	RGBHV, RGBS, RGsB
Output type	RGBHV, RGBS, RGsB
Standards	NTSC 3.58, NTSC 4.43, PAL, SECAM
Input level	0.0 V to 1.0 Vp-p
Output level	0.0 V to 7.0 Vp-p or TTL (5.0 Vp-p), unterminated

Input impedance	75 ohms
Output impedance	75 ohms
Max input voltage	5 Vp-p
Max. propagation delay	20 ns
Polarity	Positive or negative (selectable)

Audio

Gain	Unbalanced output: 0 dB; balanced output: +6 dB
Frequency response	20 Hz to 20 kHz, ± 0.05 dB
THD + Noise	0.03% @ 1 kHz, 0.3% @ 20 kHz at +19.5 dBu input, +21 dBu output, balanced/unbalanced
S/N	>90 dB at maximum output (unweighted)
Crosstalk	<-80 dB @ 1 kHz
Stereo channel separation	>80 dB @ 1 kHz
CMRR	>75 dB @ 20 Hz to 20 kHz

Audio input

Number/signal type	6 stereo, balanced/unbalanced
Connectors	(6) 3.5 mm captive screw connectors, 5 pole
Impedance	>50k ohms unbalanced, 25k ohms balanced, DC coupled
Nominal level	Configurable: -60 dBV (1 mVrms), +4 dBu (1.23 Vrms), 0 dBu (0.775 Vrms), -10 dBV (316 mVrms), -20 dBV (100 mVrms)
Maximum input level	+19.5 dBu (balanced/unbalanced) at 1%THD+N
Input gain adjustment	-15 dB to +9 dB, adjustable per input via RS-232 or front panel

NOTE 0 dBu = 0.775V, 0 dBV = 1V, 0 dBV \approx 2 dBu.

Audio output

Number/signal type	1 stereo, balanced/unbalanced
Connectors	(1) 3.5 mm captive screw connectors, 5 pole
Impedance	50 ohms, unbalanced; 100 ohms, balanced
Gain error	± 0.1 dB channel to channel
Maximum level (Hi-Z)	>+21 dBu, balanced at 1%THD+N
Maximum level (600 ohm)	>+15 dBu, balanced at 1%THD+N

Control/remote — video scaler/scan converter

Serial control port	RS-232, 9-pin female D connector
Baud rate and protocol	9600, 8-bit, 1 stop bit, no parity
Serial control pin configurations	2 = TX, 3 = RX, 5 = GND, 9 = hardwired IR
Program control	Extron's control program for Windows® Extron's Simple Instruction Set (SIS™)

General

Power	100 VAC to 240 VAC, 50/60 Hz, 30 watts, internal, autoswitchable
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Rack mount	Yes, with included brackets
Enclosure type	Metal

Appendix, cont'd

Enclosure dimensions	1.75" H x 17.5" W x 12" D (1U high, full rack wide) 4.4 cm H x 44.4 cm W x 30.5 cm D
Product weight	
DVS 406 A	6.5 lbs (2.9 kg)
DVS 406 AD	6.8 lbs (3.1 kg)
Shipping weight	11 lbs (5 kg)
DIM weight, international	12 lbs (6 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Listings	UL, CUL
Compliances	CE, FCC Class A, VCCI, AS/NZS, ICES
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE All nominal levels are at $\pm 10\%$

NOTE Specifications are subject to change without notice.

Part Numbers and Accessories

Included parts

These items are included in each order for a DVS 406 scaler:

Included parts	Part number
DVS 406/406 A/406 D/406 AD (1)	60-363-01, -02, -03, -04
Rubber feet (self-adhesive) (4)	
Rack and through-desk mounting kit	70-077-03
IEC power cord	
Tweaker (small screwdriver)	
DVS 406 User's Manual	
DVS 406 Windows-based control program	

Accessories

These items can be ordered separately:

Accessories	Part number
IR 901 remote control	70-152-01
SDI video input card	70-168-01
DVS audio input/output card	70-151-01

Firmware Upgrade Installation

In some cases the DVS 406's firmware may require replacement with an updated version. There are three user-replaceable firmware chips: U41 — the main microcontroller, U56, and U57. The numbers are printed on the circuit board. We recommend that you send the unit to Extron for service and updates.

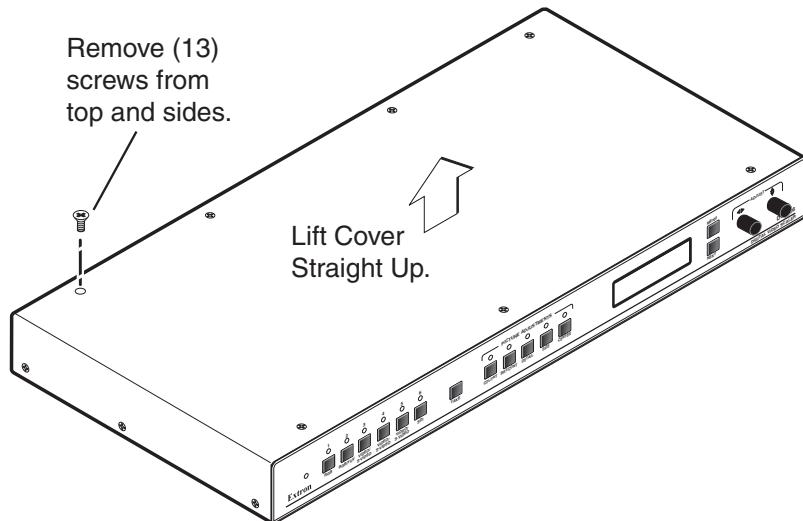
WARNING *Changes to firmware must be performed by authorized service personnel only. Some DVS 406 firmware updates must be performed at the Extron factory.*

Follow these steps to replace firmware in the DVS 406.

1. Disconnect the AC power cord from the DVS 406 to remove power from the unit. Next, remove the input/output cables.

WARNING *To prevent electric shock, always unplug the DVS 406 scaler from the AC power source before opening the enclosure.*

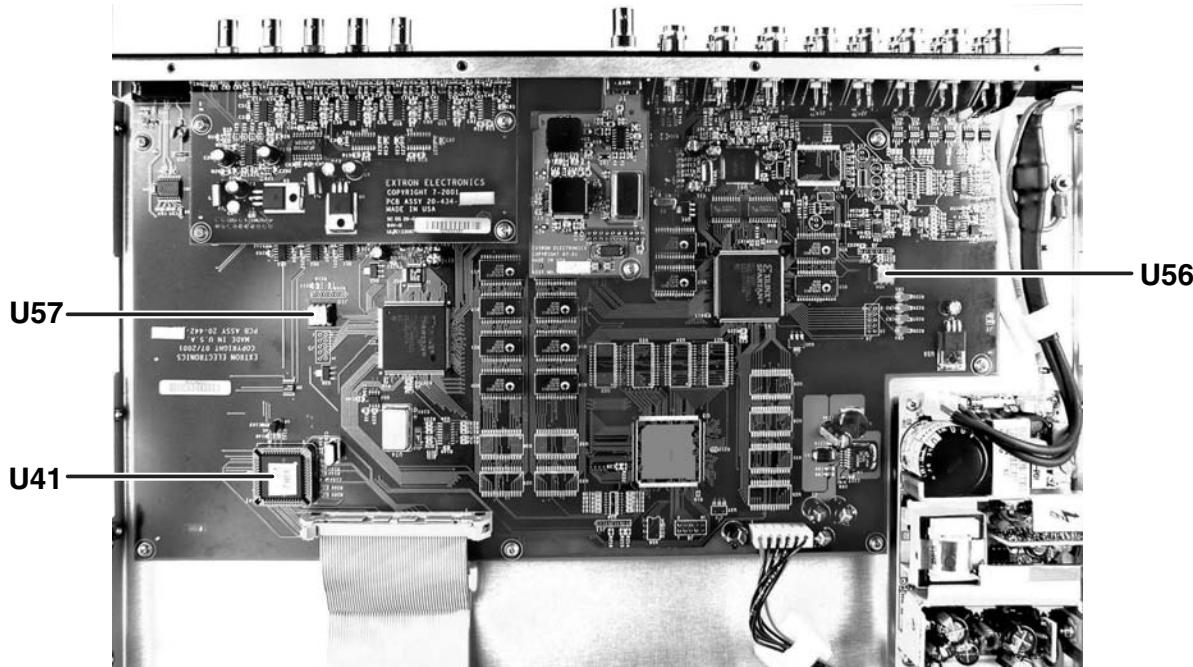
2. Remove the scaler from the rack or furniture.
3. Remove the cover of the scaler (the top half of the enclosure) by removing the screws, then lifting the cover straight up.



WARNING *Do not touch any switches or other electronic components inside the scaler. Doing so could damage the scaler. Electrostatic discharge (ESD) can damage IC chips even though you cannot feel it. You must be electrically grounded before proceeding with firmware replacement. A grounding wrist strap is recommended.*

Appendix, cont'd

4. Locate the firmware chip(s) to be replaced on the circuit board, as shown in the following illustration.

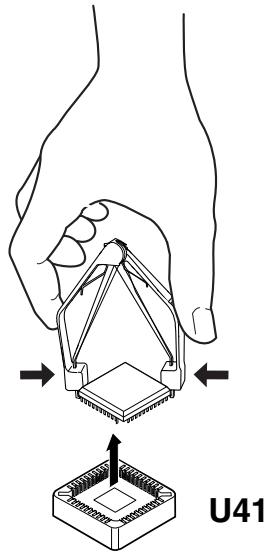


Locating the three firmware IC chips

5. After you are electrically grounded, the U56 or U57 IC chips may be removed by grasping it firmly with your fingers and pulling it out, then continuing to step 8.

Removal of the U41 IC chip requires a PLCC IC puller tool. To remove the U41 chip, align the hooks of a PLCC IC puller tool with the slots located in opposite ends of the U41 firmware chip.

6. Insert the hooks into the slots, and squeeze the tool gently to grasp the chip.
7. Pull the chip straight out of the socket, and set it aside.
8. Align the slots of the new firmware chip with the angled corners of the socket in the same orientation as the old chip.
9. Gently, but firmly, press the chip into place in the socket.
10. Replace the top cover on the DVS 406 scaler, and fasten it with the screws that were removed in step 3.
11. Rack/furniture mount the scaler, connect the input/output cables, and reconnect the AC power cord.



Audio Card Installation

The optional audio card may be installed in the scaler if it does not already have audio input/output. We recommend that you send the unit in to Extron for service and updates.

WARNING *Changes to electronic components must be performed by authorized service personnel only.*

Follow these steps to install an audio card in the DVS 406.

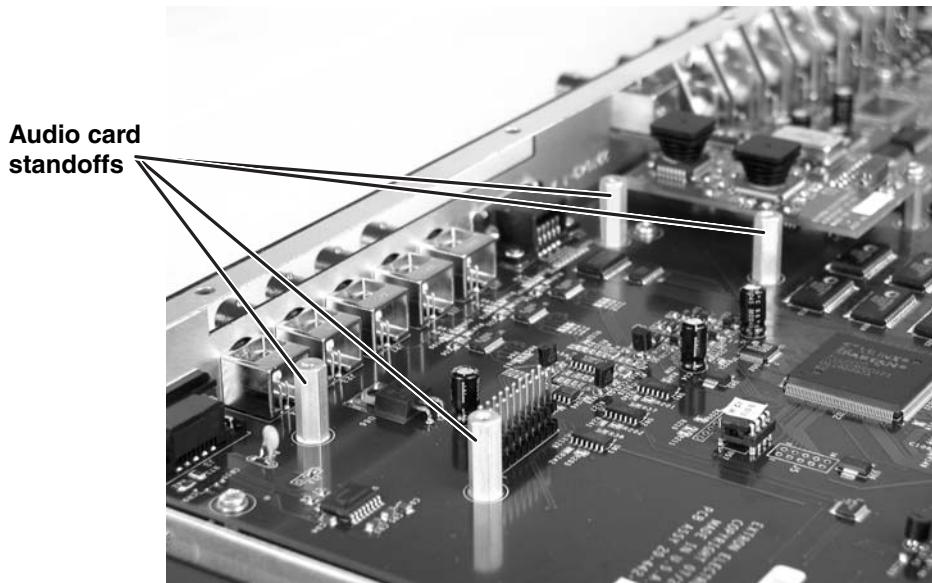
1. Disconnect the AC power cord from the DVS 406 to remove power from the unit. Next, remove the input/output cables.

WARNING *To prevent electric shock, always unplug the DVS 406 scaler from the AC power source before opening the enclosure.*

2. Remove the scaler from the rack or furniture.
3. Remove the cover of the scaler (the top half of the enclosure) by removing the screws, then lifting the cover straight up. See the top cover removal diagram in the "Firmware Upgrade Installation" section.

WARNING *Do not touch any switches or other electronic components inside the scaler. Doing so could damage the scaler. Electrostatic discharge (ESD) can damage IC chips even though you cannot feel it. You must be electrically grounded before proceeding with any electronic component replacement. A grounding wrist strap is recommended.*

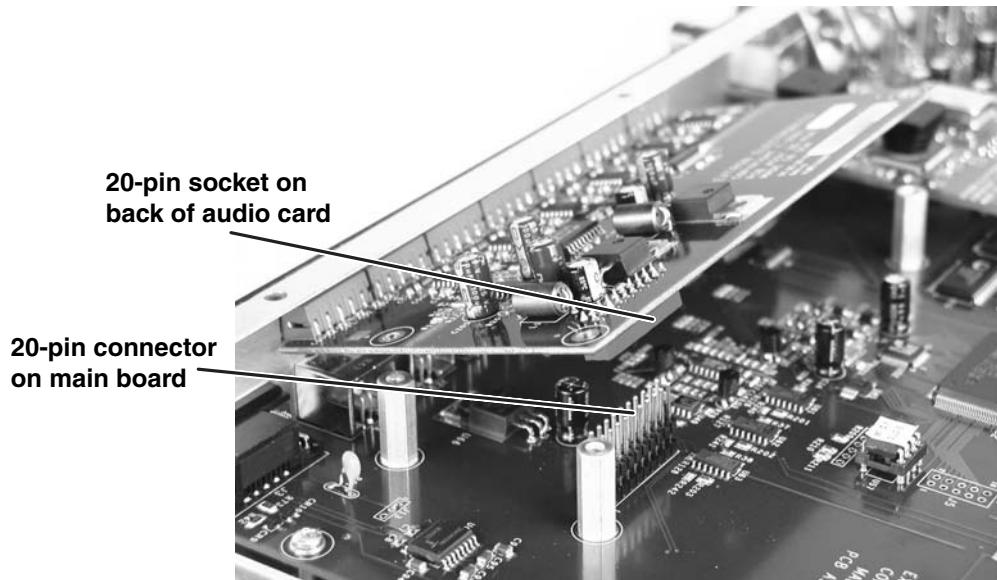
4. Locate the four audio card standoffs located near the left rear corner of the main circuit board (looking from above with the front panel nearest to you).



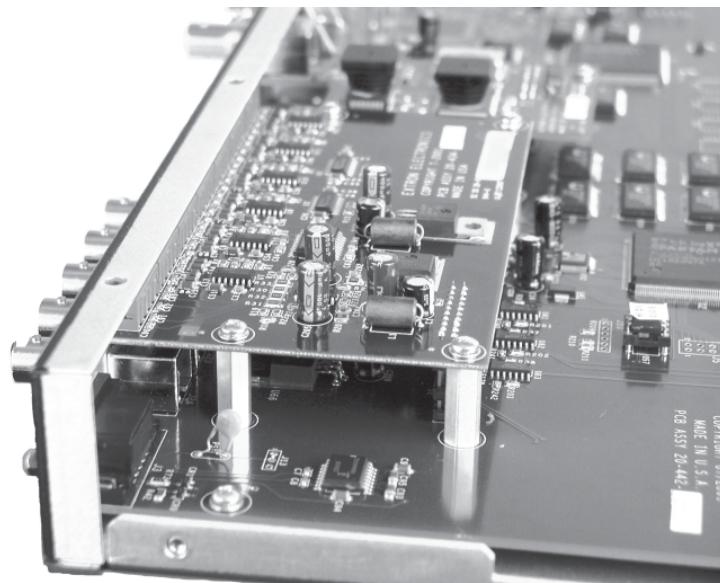
5. Remove the adhesive audio cover from the rear audio connector opening of the scaler and position the audio card at an angle with the audio connectors protruding slightly from the rear audio connector opening.

Appendix, cont'd

6. The audio card has a 20-pin socket on the underside which should align with the 20 pins on the main circuit board. Be sure to align the pins properly, in order to prevent bending the pins, before pressing the audio card firmly in place against the standoffs. The four mounting holes on the audio card should now be directly over the standoffs.



7. Insert the four installation screws through the audio card's mounting holes and gently tighten them into the standoffs.



8. Replace the top cover on the DVS 406 scaler, and fasten it with the screws that were removed in step 3.
9. Rack/furniture mount the scaler, connect the input/output cables, then reconnect the AC power cord.

Serial Digital Interface (SDI) Card Installation

The optional SDI card may be installed in the scaler if it does not already have an input for a serial digital interface signal. We recommend that you send the unit in to Extron for service and updates.

WARNING *Changes to electronic components must be performed by authorized service personnel only.*

Follow these steps to install an SDI card in the DVS 406.

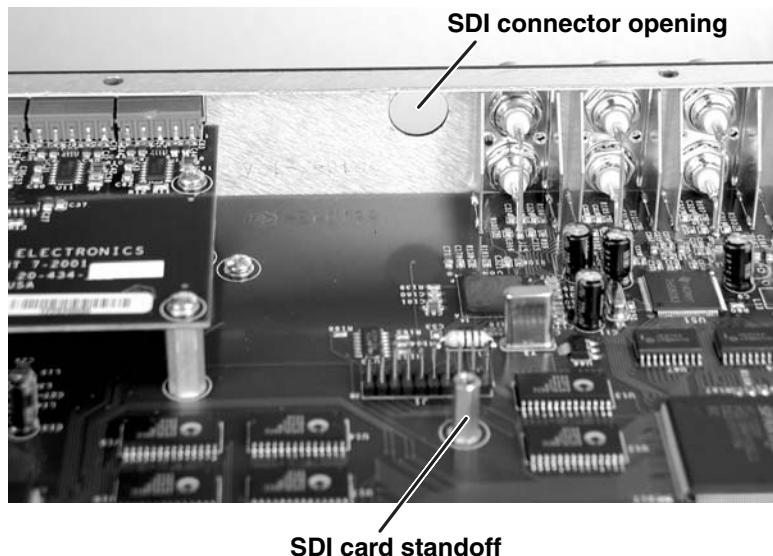
1. Disconnect the AC power cord from the DVS 406 to remove power from the unit. Then disconnect the input/outut cables.

WARNING *To prevent electric shock, always unplug the DVS 406 scaler from the AC power source before opening the enclosure.*

2. Remove the scaler from the rack or furniture.
3. Remove the cover of the scaler (the top half of the enclosure) by removing the screws, then lifting the cover straight up. See the top cover removal diagram in the "Firmware Upgrade Installation" section.

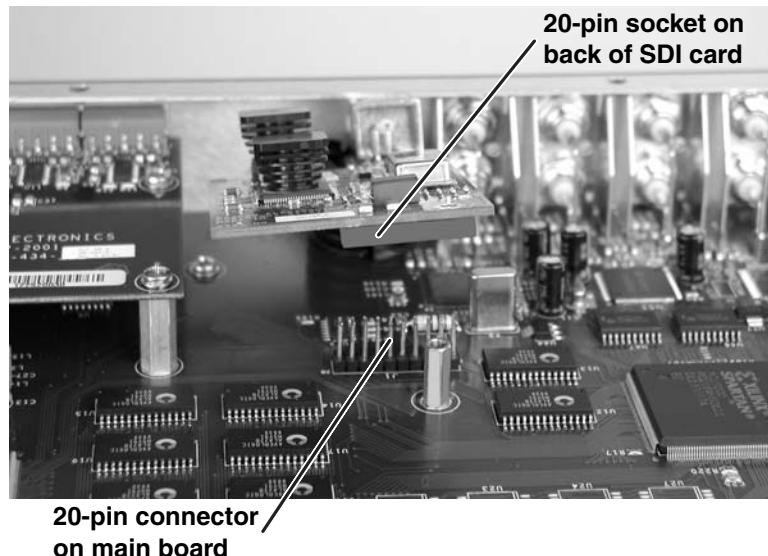
WARNING *Do not touch any switches or other electronic components inside the scaler. Doing so could damage the scaler. Electrostatic discharge (ESD) can damage IC chips even though you cannot feel it. You must be electrically grounded before proceeding with any electronic component replacement. A grounding wrist strap is recommended.*

4. Locate the SDI card standoff located near the middle rear portion of the main circuit board (looking from above with the front panel nearest to you).

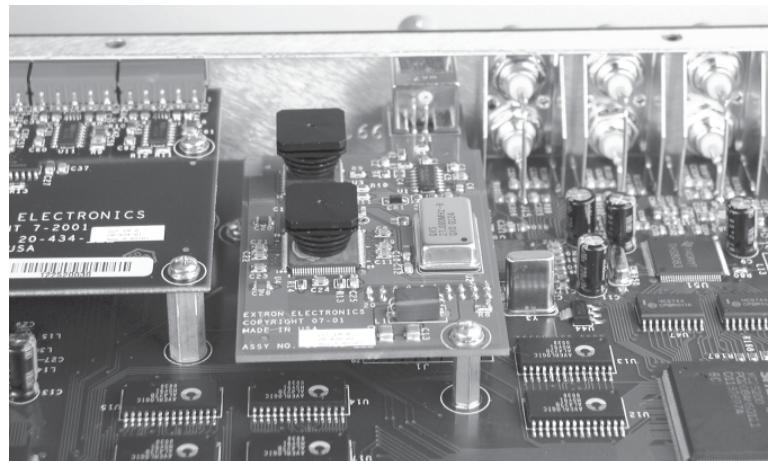


5. Remove the adhesive SDI cover from the rear SDI connector opening of the scaler and position the SDI card at an angle with the SDI connector protruding from the rear SDI connector opening.
6. The SDI card has a 20-pin socket on the underside which should align with the 20 pins on the main circuit board. Be sure to align the pins properly, in order to prevent bending the pins, before pressing the SDI card firmly in place against the stand-off. The mounting hole on the SDI card should now be directly over the stand-off.

Appendix, cont'd



7. Insert the card's installation screw through the SDI card's mounting hole and gently tighten it into the standoff.



8. Install the SDI connector's hex nut and keep the SDI card from twisting as the nut is tightened.
9. Replace the top cover on the DVS 406 scaler, and fasten it with the screws that were removed in step 3.
10. Rack/furniture mount the scaler, connect the input/output cables, and reconnect the AC power cord.

FCC Class A Notice

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Note: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance.

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and / or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:

Extron Electronics
1001 East Ball Road
Anaheim, CA 92805, USA

Europe, Africa, and the Middle East:

Extron Electronics, Europe
Beeldschermweg 6C
3821 AH Amersfoort
The Netherlands

Asia:

Extron Electronics, Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363

Japan:

Extron Electronics, Japan
Kyodo Building
16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.



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